Cornell University Library
QL 696.A2F5
C.3
The hawks and owls of the United States
3 1924 022 522 563
orni

FRAGILE
DOES NOT
CIRCULATE

SHOUT
SHARE
IT

The original of this book is in
the Cornell University Library.

There are no known copyright restrictions in
the United States on the use of the text.

http://www.archive.org/details/cu31924022522563

CORNELL
LAB of ORNITHOLOGY

LIBRARY
at Sapsucker Woods

Illustration of Bank Swallow by Louis Agassiz Fuertes

LABORATORY OF ORNITHOLOGY
CORNELL UNIVERSITY
ITHACA, NEW YORK

DATE DUE

GAYLORD			PRINTED IN U.S.A.

U. S. DEPARTMENT OF AGRICULTURE
DIVISION OF ORNITHOLOGY AND MAMMALOGY
BULLETIN No. 3

THE HAWKS AND OWLS OF THE UNITED STATES IN THEIR RELATION TO AGRICULTURE

PREPARED UNDER THE DIRECTION OF
DR. C. HART MERRIAM, ORNITHOLOGIST
BY
A. K. FISHER, M. D.
ASSISTANT ORNITHOLOGIST

[Illustrated by J. L. Ridgway]

PUBLISHED BY AUTHORITY OF THE SECRETARY OF AGRICULTURE

WASHINGTON
GOVERNMENT PRINTING OFFICE
1893

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF ORNITHOLOGY AND MAMMALOGY,
Washington, D. C., October 5, 1892.

SIR: I have the honor to transmit herewith, as Bulletin No. 3 of this Division, a report on the Hawks and Owls of the United States, with special reference to the economic status of the various species, by Dr. A. K. Fisher, assistant ornithologist.

This work was written several years ago, but was withheld from publication until provision could be made for suitable reproduction of the colored illustrations, without which the bulletin would have been of comparatively little value to the class of readers for whose benefit it was specially prepared.

The statements herein contained respecting the food of the various hawks and owls are based on the critical examination, by scientific experts, of the actual contents of about 2,700 stomachs of these birds, and consequently may be fairly regarded as a truthful showing of the normal food of each species. The result proves that a class of birds commonly looked upon as enemies to the farmer, and indiscriminately destroyed whenever occasion offers, really rank among his best friends, and with few exceptions should be preserved, and encouraged to take up their abode in the neighborhood of his home. Only six of the 73 species and subspecies of hawks and owls of the United States are injurious. Of these, three are so extremely rare they need hardly be considered, and another (the Fish Hawk) is only indirectly injurious, leaving but two (the Sharp-shinned and Cooper's Hawks) that really need be taken into account as enemies to agriculture. Omitting the six species that feed largely on poultry and game, 2,212 stomachs were examined, of which 56 per cent contained mice and other small mammals, 27 per cent insects, and only 3½ per cent poultry or game birds. In view of these facts the folly of offering bounties for the destruction of hawks and owls, as has been done by several States, becomes apparent, and the importance of an accurate knowledge of the economic status of our common birds and mammals is overwhelmingly demonstrated.

Respectfully,

C. HART MERRIAM,
Chief of Division.

Hon. J. M. RUSK,
Secretary of Agriculture.

CONTENTS.

	Page.
Letter of transmittal	3
Table of contents	5
List of illustrations	7
Introduction	9
Biographies of species:	
Swallow-tailed Kite (*Elanoides forficatus*)	20
White-tailed Kite (*Elanus leucurus*)	23
Mississippi Kite (*Ictinia mississippiensis*)	24
Everglade Kite (*Rostrhamus sociabilis*)	25
Marsh Hawk (*Circus hudsonius*)	26
Sharp-shinned Hawk (*Accipiter velox*)	32
Cooper's Hawk (*Accipiter cooperi*)	38
Goshawk (*Accipiter atricapillus*)	43
Harris's Hawk (*Parabuteo unicinctus harrisi*)	47
Red-tailed Hawk (*Buteo borealis*)	48
Red-shouldered Hawk (*Buteo lineatus*)	62
Zone-tailed Hawk (*Buteo abbreviatus*)	71
White-tailed Hawk (*Buteo albicaudatus*)	72
Swainson's Hawk (*Buteo swainsoni*)	72
Cooper's Buzzard (*Buteo cooperi*)	79
Broad-winged Hawk (*Buteo latissimus*)	79
Short-tailed Hawk (*Buteo brachyurus*)	83
Mexican Black Hawk (*Urubitinga anthracina*)	84
Mexican Goshawk (*Asturina plagiata*)	85
Rough-legged Hawk (*Archibuteo lagopus sancti-johannis*)	86
Ferruginous Rough-leg (*Archibuteo ferrugineus*)	91
Golden Eagle (*Aquila chrysaëtos*)	93
Bald Eagle (*Haliæetus leucocephalus*)	97
Gyrfalcons (*Falco islandus et Falco rusticolus*)	102
Prairie Falcon (*Falco mexicanus*)	104
Duck Hawk (*Falco peregrinus anatum*)	106
Pigeon Hawk (*Falco columbarius*)	109
Richardson's Merlin (*Falco richardsonii*)	114
Aplomado Falcon (*Falco fusco-cœrulescens*)	114
Sparrow Hawk (*Falco sparverius*)	115
Audubon's Caracara (*Polyborus cheriway*)	128
Osprey (*Pandion haliaëtus carolinensis*)	130
Barn Owl (*Strix pratincola*)	132
Long-eared Owl (*Asio wilsonianus*)	140
Short-eared Owl (*Asio accipitrinus*)	145
Barred Owl (*Syrnium nebulosum*)	150
Spotted Owl (*Syrnium occidentale*)	156
Great Gray Owl (*Scotiaptex cinerea*)	157

Biographies of species—Continued. Page.
Richardson's Owl (*Nyctala tengmalmi richardsoni*) 159
Saw-whet Owl (*Nyctala acadica*) 160
Screech Owl (*Megascops asio*) 163
Flammulated Screech Owl (*Megascops flammeolus*) 173
Great Horned Owl (*Bubo virginianus*) 174
Snowy Owl (*Nyctea nyctea*) 182
Hawk Owl (*Surnia ulula caparoch*) 187
Burrowing Owl (*Speotyto cunicularia hypogæa*) 189
Pygmy Owl (*Glaucidium gnoma*) 196
Ferruginous Pygmy Owl (*Glaucidium phalænoides*) 199
Elf Owl (*Micropallas whitneyi*) 200

ILLUSTRATIONS.

		Page.
Plate 1.	Swallow-tailed Kite (*Elanoides forficatus*)	20
2.	Mississippi Kite (*Ictinia mississippiensis*)	24
3.	Marsh Hawk (*Circus hudsonius*)	26
4.	Sharp-shinned Hawk (*Accipiter velox*)	32
5.	Cooper's Hawk (*Accipiter cooperi*)	38
6.	Goshawk (*Accipiter atricapillus*)	43
7.	Red-tailed Hawk (*Buteo borealis*)	48
8.	Red-shouldered Hawk (*Buteo lineatus*)	62
9.	Swainson's Hawk (*Buteo swainsoni*)	72
10.	Broad-winged Hawk (*Buteo latissimus*)	79
11.	Rough-legged Hawk (*Archibuteo l. sancti-johannis*)	86
12.	Ferruginous Rough-leg (*Archibuteo ferrugineus*)	91
13.	Golden Eagle (*Aquila chrysaëtos*)	93
14.	Bald Eagle (*Haliœetus leucocephalus*)	97
15.	Duck Hawk (*Falco peregrinus anatum*)	106
16.	Pigeon Hawk (*Falco columbarius*)	109
17.	Sparrow Hawk (*Falco sparverius*)	115
18.	Osprey (*Pandion haliaëtus carolinensis*)	130
19.	Barn Owl (*Strix pratincola*)	132
20.	Long-eared Owl (*Asio wilsonianus*)	140
21.	Short-eared Owl (*Asio accipitrinus*)	145
22.	Barred Owl (*Syrnium nebulosum*)	150
23.	Screech Owl (*Megascops asio*)	163
24.	Great Horned Owl (*Bubo virginianus*)	174
25.	Burrowing Owl (*Speotyto cunicularia hypogœa*)	189
26.	Dwarf Screech Owl (*Megascops flammeolus idahoensis*)	173

THE HAWKS AND OWLS OF THE UNITED STATES.

INTRODUCTION.

That birds are not only beautiful but that they perform an important economic office is an almost universal belief; and it is also generally admitted that they should be protected by law and their increase encouraged in every way possible. To the farmer, however, it is well known that certain kinds, as crows, robins, blackbirds, rice birds, and some others, are more or less injurious, and at times do great damage to the growing or ripened crops.

When certain birds are known to be harmful to agricultural interests, the farmer has a right to ask that the protection of law be withdrawn from such species, and even that means be taken to diminish their numbers. At first it might seem an easy matter to class birds into two great groups, the injurious species and the beneficial species; but in reality it is very difficult, for however harmful a species may be at one season of the year or in a certain region, it may be quite the reverse at another season or in a different region. Thus the bobolink is one of the most highly-prized visitors in the Northern States, and the damage it does to the crops there is so infinitesimal that this weighs nothing against the attractions of its presence and the beauty of its song; in the Southern States this same bobolink, so changed in plumage as to easily pass under an alias, the rice-bird, does immense damage to the rice crop—a damage which amounts to over a million of dollars a year.

Another example of the beneficial-injurious species is the crow. What farmer needs to be told of the unprincipled conduct of Jim Crow at and immediately after corn-planting time. The ever-present scarecrow bears mute witness to the crow's fondness for corn and his thieving habits. But when the corn is past danger the crow changes from an obnoxious to an exemplary member of bird society, and the war he wages on the cutworm earns him no scanty meed of praise from the grass farmer.

Thus it will be seen that the division of our birds into beneficial and harmful kinds is not the easy task it seems, and that even farmers may differ widely as to the status of a certain kind. However they may fail to agree concerning the species just mentioned and others that might be named, there seems to be but one opinion the broad land over as to the status of the hawks and owls; they at least are believed to be

wholly harmful; and not only is the farmer boy encouraged to kill every hawk and owl about the farm and to destroy its nest, but the powers of the law are invoked to offer the incentive of bounties for hawks' and owls' heads.

If this widespread belief in the harmful propensities of these birds is correct, then their wholesale destruction is laudable. If, however, such belief is erroneous, the consequences are mischievous enough.

It is important to observe that all the rapacious birds are slow breeders, and, contrary to popular belief, there is no good evidence that any of them have two broods a year, though of course if the first set of eggs is lost another one will be deposited. There is every reason why they should not raise more than one brood, for notwithstanding the fact that they breed very early in the year, the young grow slowly and remain a long time in the nest. Hence the tax upon the parent birds to secure enough food to satisfy the enormous appetites of their slow-growing progeny is very great, probably twice that made upon the members of any other order of land birds.

State laws, therefore, passed for the destruction of hawks and owls, and offering a bounty on their heads, are very effective, either for good or evil. One of the counties of Pennsylvania paid out in a year over $5,000 for scalps of birds of prey. In the light of the foregoing facts it will readily be understood how long a time it will take to replace these birds, whose destruction cost the State of Pennsylvania so much money, in case their services are wanted. There is no doubt that this State and others which have passed similar laws have made a serious mistake; for it is indisputable that the opinion about hawks and owls, so widespread and popular, is not well founded; and it is the purpose of this bulletin to set forth the results of many years' observations with the view of dispelling the popular illusion regarding the destructiveness of hawks and owls as a class. It may be stated with confidence—

(1) That owls are among the most beneficial of all birds, inflicting very little damage upon the poulterer and conferring vast benefits upon the farmer. The relations which owls bear to agriculture are peculiar and important. Their eyesight, unlike that of hawks, which hunt by day, is by no means so defective in daylight as popularly supposed, but is keenest in the early hours of evening and in early morning. Hunting thus in dim light, their food consists largely of those animals which hawks do not trouble at all, or destroy only in small numbers. The work of owls thus supplements that of hawks and materially assists in preventing an undue increase of many obnoxious rodents. Again, though owls are somewhat migratory they are far less so as a class than hawks, and hence in winter, when the latter have left the Northern States for warmer climes, they remain at home and carry on their incessant warfare against injurious rodents.

(2) That all hawks, with possibly one or two exceptions, are to some extent beneficial to the farmer.

Although the facts concerning the food of hawks and owls are set forth in detail under the several species, a few words are here added on this the most important branch of the subject to the farmer. For convenience of discussion the forty-nine species and twenty-four subspecies of rapacious birds may be separated into four classes, as follows:

(*a*) Those wholly beneficial or wholly harmless.

(*b*) Those chiefly beneficial.

(*c*) Those in which the beneficial and harmful qualities seem to balance each other.

(*d*) Those positively harmful.

The first class (*a*) includes six species: Rough-legged Hawk, Squirrel Hawk, Swallow-tailed Kite, White-tailed Kite, Mississippi Kite, and Everglade Kite.

The Rough-legged Hawk, one of our largest species, seems to feed exclusively upon the smaller rodents, and, as it is found within the United States from October to April, the number of meadow mice it destroys is almost incalculable. It passes under the name of 'Hen Hawk,' and many a luckless Rough-leg is shot for the latter, and perhaps a bounty collected on it, when in fact it never destroyed a hen or chicken in its life.

The statement of Pennant and some of the earlier writers, that it attacks ducks and other birds, lacks confirmation.

The Squirrel Hawk, a near cousin to the Rough-leg, has received its name because of its inordinate fondness for the ground squirrels, which are so terribly destructive to the crops in the far West.

The four kites named above, while not so beneficial to the farmer as the two hawks just mentioned, are harmless to poultry, and feed largely upon reptiles, insects, and snails.

The second class (*b*), those mainly beneficial, includes the greater number of species, and to it belong some of the most widely distributed and best known hawks. It includes the following: Marsh Hawk, Harris' Buzzard, Red-tailed, Hawk, Red-shouldered Hawk, Short-tailed Hawk, White-tailed Hawk, Swainson's Hawk, Short-winged Hawk, Broad-winged Hawk, Mexican Black Hawk, Mexican Goshawk, Sparrow Hawk, Audubon's Caracara, Barn Owl, Long-eared Owl, Short-eared Owl, Great Gray Owl, Barred Owl, Western Barred Owl, Richardson's Owl, Acadian Owl, Screech Owl, Flammulated Screech Owl, Snowy Owl, Hawk Owl, Burrowing Owl, Pygmy Owl, Ferruginous Pygmy Owl, and Elf Owl.

The Marsh Hawk, which heads the list, is also one of the first in economic importance. It is distributed over the entire United States, is abundant almost everywhere, and may be easily recognized by its long, slim form and from the manner in which it beats back and forth over the prairies, marshes, and meadows in search of ground squirrels and mice, of which it annually destroys vast numbers. It would have

a secure place in the first class were it not for the fact that occasionally it seizes small birds and, less frequently, a stray chicken. Still the harm it does in this way is inconsiderable compared with the benefits it confers by the destruction of harmful rodents.

The Buzzard Hawks, which include the next nine species, are large and sluggish and too slow of wing to secure such agile prey as wild birds or even poultry. Their staple food consists of small mammals, insects, snakes, toads, and frogs.

The Red-tailed Hawk, in some respects the representative of the group, is one of the best known hawks, and shares with the Red-shouldered Hawk the odious appellation of 'Hen Hawk.' It is not to be denied that both species occasionally attack poultry, but the amount destroyed is so small compared with their other food—mostly noxious animals—that it is scarcely to be considered, except perhaps by the individual farmer whose barnyard happens to be visited by the robber. Moreover, in a large majority of cases the poultry and game secured by these hawks are the less active individuals, which from age, accident, or disease are unable to escape from their attacks.

The Red-shouldered Hawk is probably one of the most omnivorous of our birds of prey—eating with apparent relish the following creatures, which represent as many different classes: Mice, birds, snakes, frogs, fish, grasshoppers, centipedes, spiders, crawfish, earthworms, and snails. At least 65 per cent of its food consists of injurious mammals, and, taking into consideration also the number of insects devoured, the showing is remarkably good for the poor 'Hen Hawk,' especially when less than 2 per cent consists of the food which confers upon it that *sobriquet*. Both these hawks suffer for the misdeeds of others, and are striking examples of the effects of having a bad name.

Swainson's Hawk is another of the *Buteos* which is of great service, warring upon creatures which do injury to crops. Its food is much the same as that of the other hawks of this class, except that insects seem to be eaten in larger numbers. Grasshoppers and crickets are particularly sought after, and on the foothills and plains of the West Swainson's Hawks congregate in large flocks wherever these insects are abundant. Dr. Merriam has estimated that at least 200 grasshoppers are consumed daily by one hawk; and in the course of a month a flock of about 165 individuals, which is a small estimate of the number actually seen together in various localities feeding upon grasshoppers, will destroy 1,000,000 adult insects—a benefit to agriculture which no farmer can fail to appreciate.

When we consider the enormous amount of damage grasshoppers have inflicted in a single season in some of the Western States—Kansas for instance—the great benefit that results from the labors of this and other hawks can not be doubted. Many of the game birds—as the turkey, prairie chicken, sage cock, and quail—devour many grasshoppers;

but these birds are valuable as food, and as a consequence have been nearly exterminated in some States, and their numbers are fast being depleted in all. They can no longer be depended upon as allies of the farmer. The same is true of many animals, like the skunks and foxes, and also snakes, all of which, for different reasons, are killed whenever possible. So it is that their natural enemies having been exterminated or much reduced in numbers, noxious insects, such as grasshoppers, have a chance, when favored by exceptionable seasons, to multiply to an astonishing extent; and so it is that having multiplied to a degree impossible to calculate, they suddenly assume the offensive, and, like an invading army, take possession of the whole country and strip it of every green thing. Surely no more economical method of holding these hordes in check can be desired than the fostering of means already provided by nature. Apparently quite ignorant of the habits of hawks and owls, the legislature of at least one of the Western States—Colorado—some years since passed a bounty act which included these birds. As a result thousands of grasshopper-eating hawks were destroyed at the expense of the State—an expense by no means to be estimated by the number of dollars paid out as blood money; for if the destruction be carried far enough and the birds of prey actually exterminated, there is every reason to believe that sooner or later one of the consequences will be another grasshopper plague.*

The Broad-winged Hawk is another species which feeds to a considerable extent on insects, destroying vast numbers of grasshoppers and crickets. It is especially fond of the larvæ of the large moths which feed on the leaves of fruit and shade trees, and during the late summer and early autumn it is exceptional to find one that has not been indulging in this kind of food. Snakes, toads, frogs, and the smaller rodents also form a considerable portion of its fare. It rarely attacks birds.

The little Sparrow Hawk is the only one of the true falcons which can be placed in the present class, and, although at times it follows the example of its larger congeners and attacks small birds and young poultry, these irregularities are so infrequent compared with its constant good service in destroying insects and mice that they are hardly to be considered. It is, in fact, too small to cope with any but very small chickens. Grasshoppers and crickets form its principal food during the warmer months, while mice predominate during the rest of the year.

Among the owls of this class which deserve special mention the Barn Owl is probably the most important from an economic point of view, and it is questionable whether it should not have been placed in the previous class, as its food is almost entirely made up of injurious mammals. In the West it feeds very largely on pouched gophers, and the

* The writer, who passed through the counties of Bent and Logan in July, 1892, saw every indication of the commencement of another grasshopper plague, as myriads of grasshoppers were feeding on the alfalfa and wheat.

stomach contents of the individuals examined and the fragments of food found about its nests reveal traces of very little else than the remains of these rodents. To appreciate properly the services of this owl it must be remembered that the pouched gophers are among the most, if not the most, destructive mammals which inhabit this country. In the South this owl lives largely on cotton rats, another very destructive animal, and at various places it has been found to feed extensively on the common rat.

The Long-eared and Short-eared Owls feed extensively on mice and sparingly on small birds—mostly grain-eating or seed-eating species, which are of slight economic importance. All of the common species of mice are found among the stomach contents, and as both birds are numerous the service done the farmer is correspondingly great.

The Barred Owl, if any reliance may be placed upon the accounts of earlier writers, feeds largely upon poultry and game, though from more recent investigations it would seem that either the bird has modified its habits or that the statements of their destructiveness are very much exaggerated. Our own examinations, so far as they go, prove that less than 3 per cent of the food of this bird consists of poultry, while a large proportion consists of such rodents as rabbits, squirrels, and various species of rats and mice. It feeds quite extensively also on frogs and crawfish.

The little Screech Owl, so well known in most parts of the country, is indefatigable in its work of destroying mice and insects. It may often be seen at dusk hovering about barns and outhouses watching for mice, or skimming over the fields or along the hedge rows in search of grasshoppers, crickets, and beetles. During the time it is caring for its young it occasionally captures small birds, as well as in winter when hard pressed for food. As an offset, the individuals inhabiting the city parks have learned to feed more or less extensively on the English sparrow, for which good service they should be particularly commended, as the English sparrow has become a most destructive nuisance.

The Burrowing Owl is the only remaining species of this class which will be specially mentioned. During the warmer parts of the year it feeds extensively on scorpions, centipedes, grasshoppers, crickets, and various species of beetles, as well as on mice and ground squirrels. Few birds are destroyed by it. Occasionally when other food is scarce, especially in the northern part of its range in winter, it is forced to prey upon small birds, from necessity rather than choice. There is no excuse whatever for destroying this owl and it should be protected by law.

The third class (*c*) includes those birds whose beneficial and noxious qualities about balance one another. As was said above of birds generally, so it may be said of hawks and owls, that frequently a species which in one place is properly to be considered noxious from its pred-

atory visits to the farmyard or because of attacks on game and song birds, in another locality may be of immense value on account of its service in destroying injurious mammals or insects. For example, the Great Horned Owl, which in the East is persistent in its attacks on poultry and game, in the rabbit-infested portions of the West destroys such immense numbers of these rodents that its assistance is invaluable to the farmer. The above statement applies with greater or less force to the following species, which are included in the third class: Golden Eagle, Bald Eagle, Pigeon Hawk, Richardson's Hawk, Aplomado Falcon, Prairie Falcon, and Great Horned Owl.

The Bald Eagle and Golden Eagle may be considered as beneficial to the agriculturist in parts of the country where rabbits, prairie dogs, or gophers are common, but in sections where sheep are extensively raised they are often very injurious.

The latter species, our National Bird, by preference eats fish and is a successful fish-catcher when it can not get the Fish Hawk to do its fishing for it. It also feeds extensively on dead fish which have washed ashore. In some localities, especially in the South, it is destructive to waterfowl, killing any and all of the species, from swans and geese down to the smaller ducks and coots. However, as it has been chosen for our national emblem, we should not begrudge it a livelihood and may, perhaps, allow it to choose what it will in the way of wild game.

The Prairie Falcon, whose fondness for many of the ground squirrels causes it to follow them relentlessly, in this way nearly, if not quite, balances the harm it does by destroying waterfowl and upland game as well as insectivorous birds.

The Pigeon Hawk, Aplomado Falcon, and Richardson's Merlin are true falcons, whose food consists of birds of various kinds, but they consume enough injurious insects and mammals to partially offset the harm done.

The fourth and last class (*d*) includes those species which feed mainly on animals that subserve a useful purpose to man and do not to any appreciable extent destroy noxious animals. The following species are included in this class: Sharp-shinned Hawk, Cooper's Hawk, Goshawk, Duck Hawk, the Gyrfalcons, and Fish Hawk.

Fortunately the Goshawk is comparatively rare in most farming districts of the United States, as it is a bird of the far North; otherwise its destructiveness to poultry would be very great. Few species are more fond of poultry and game, and its large size enables it to carry off with ease a full-grown chicken. Ruffed grouse too often fall a prey to it, and on account of its partiality to this bird it is known as 'Partridge Hawk' in some parts of the country. In fall and winter it captures a considerable number of squirrels and rabbits and with ease strikes down a full-grown northern hare.

Cooper's Hawk is a common species in suitable localities throughout the United States and southern Canada. Much of the ill-favor with which birds of prey as a whole are looked upon is due to the depreda-

tions of this, the true 'Chicken Hawk,' together with those of its smaller congener, the Sharp-shinned Hawk. Both species feed almost exclusively on the flesh of either domesticated or wild birds. When they find a farm where chickens can be captured with impunity they make daily excursions to it, and unless killed will sometimes nearly depopulate the yard. Domesticated pigeons are particularly sought after by Cooper's Hawk, and when a keen-eyed individual once locates a cote the destruction to the inmates is great. Quails and young grouse are also favorite food of both of these hawks.

In one direction their fondness for the flesh of birds promises to be of great benefit to the country, namely, in the destruction of English sparrows. Both of these hawks have learned from experience that a desirable food and one easy to obtain is to be found in the towns, hence it is not an uncommon sight, even in the streets of our large cities, to see one of them dash into a flock of sparrows. This, however, is the only benefit conferred upon mankind by Cooper's and the Sharp-shinned Hawks, for they very rarely attack mammals and insects. Their small size, daring, and rapid flight render them easily recognizable, and they need seldom be mistaken for their innocent relations. Unquestionably both species should be destroyed whenever and whenever possible.

The Gyrfalcons, the largest and most powerful of the true falcons, are rarely seen within our borders, and then only in winter. They feed largely upon ptarmigan, grouse, waterfowl, hares, and poultry when the latter is available, and occasionally on small mammals.

The Duck Hawk is another powerful falcon, and one closely related to the famous Peregrine Falcon of the Old World, which was used so extensively in falconry in 'ye olden time.' As its name implies, it is a persistent follower of waterfowl and, when these are available, it takes little else as food. In default of waterfowl it will attack poultry and, in fact, birds of any sort even down to the smallest insectivorous species. Like others of the class, little can be said in its favor. Fortunately for the poultry yards and game coveys this falcon is rare in most parts of the United States; in fact the Sharp-shinned and Cooper's Hawks are the only two of the destructive species which are at all common throughout the greater part of the United States and southern Canada.

The Fish Hawk, although a magnificent bird and one that lends attractiveness to many a scene by sea and river, can not be classed as a useful species, from an economic standpoint. It eats fish, and fish only, and is often a nuisance to the fish culturist. Moreover, while unquestionably its food is largely comprised of the inferior species of fish, some of the most useful kinds, as trout, bass, mullet, and others fall victims to its splendid powers as a fisher. If its fine presence and magnificent flight do not sufficiently plead in its favor, then it must be put on the black list.

It will be seen from the above that of the rapacious birds with which our country is so well furnished, there are but few which deserve to be put on the black list and pursued without mercy. The greater number either pass their whole lives in the constant performance of acts of direct benefit to man or else more than make good the harm they do in the destruction of insectivorous birds and poultry by destroying a much greater number of animals well known to be hostile to the farmer.

The birds of prey are all peculiarly fitted by nature to play their parts in the maintenance of the balance in the animal world. Possessed of amazingly acute eyesight, strong bills for tearing their prey, sharp talons that lock with a never-failing clutch and insure the speedy death of a victim by piercing its very entrails, added to ample and enduring powers of wing, they must be admitted to be well equipped for their occupation. They are all great eaters, and when the supply of food is unlimited are gorged during most of the time. Their digestion is very rapid and their assimilation perfect; consequently the amount of food a bird consumes each day in relation to its own weight is very great. It is well that it is so, for the habit of taking more food than is necessary for their immediate needs enables them to store up force for future emergencies and preëminently fits them for the work of keeping nature's balance true. They are required at times, from inclement weather or other causes, to withstand great exposure and long protracted fasts, which they do with little inconvenience.

In the case of the birds of prey, as in some of the other orders, the indigestible portions of food, such as feathers, hair, bones, and the hard coverings of insects, are formed into balls by the movements of the stomach, after the nutritious portions have been absorbed. These masses, which are known as 'pellets,' are regurgitated from the stomach before a new supply of food is taken. The movements of the stomach so shape these 'pellets' that every sharp piece of bone or hard material which might otherwise injure the mucous membrane is carefully enveloped by a felty covering of hair or feathers. In the case of some of the owls which have regular roosting places vast numbers of these pellets collect, and an examination of them will give a perfect index to the character of the food devoured.

No less than 2,690 stomachs have been examined in the preparation of this bulletin, and the contents are enumerated in the tables accompanying the species. Of these, 169 contained the remains of poultry and game birds; 463, of other birds; 966, of mice; 397, of other mammals; and 623, of insects. If the stomachs of the six species which feed very largely upon game and poultry are eliminated we have a total of 2,212 stomachs. Of these 78, or 3½ per cent, contained the remains of poultry or game; 257, or 11 per cent, of other birds; 945, or 42½ per cent, of mice; 309, or 14 per cent, of other mammals; and 599, or 27 per cent, of insects.

As this bulletin is intended to be of practical benefit to the farmer descriptions are given of all our birds of prey by which he may tell his friends from his foes, that he may preserve the former and destroy the latter. These descriptions have been made as short and as terse as is compatible with clearness and have been stripped of all technicalities. Some little explanation is needed in reference to measurements: *Length* means the total length of fresh specimens from end of bill to tip of tail. *Extent* is also taken from fresh specimens and is measured from the tip of one wing to that of the other, they being moderately stretched. The wing measurement may be from a dried skin and is taken from the bend of the wing to the end of the longest feather. The *Tail* measurement is taken from the tip of the longest feathers to the back part of the eminence of the oil sac. Moreover, to insure the correct identification of the several species, figures of the more important have been added. By means of the descriptions and figures it is believed that the farmer may readily become acquainted with the birds here treated of. For the benefit of those whose interest in the subject extends beyond its economic side, a short account of each species is added, with some particulars of their nesting habits, etc. The nomenclature adopted is that of the American Ornithologists' Union. The geographical races, or subspecies, are included under the typical species, since the habits of both are practically identical, the main differences between them being color and to a less extent size.

In closing, the writer wishes specially to express his indebtedness to Mr. H. W. Henshaw, who has assisted him in various ways in the preparation of the present bulletin. He also wishes to acknowledge his obligations to Dr. E. A. Mearns, U. S. Army, who kindly placed in his hands original data on the food of several hundred hawks and owls.

To Dr. W. C. Avery, F. E. L. Beal, C. S. Brimley, Amos W. Butler, Charles Dury, R. Elliott, L. S. Foster, Gustave Kohn, Austin F. Park, William Praeger, F. Stephens, and Dr. B. H. Warren, who have furnished manuscript data on the food of rapacious birds, thanks are also due.

A large majority of the stomachs which furnish data for the tables accompanying this bulletin and lend them their chief value were presented by the following persons, to whom the writer wishes to extend his sincere acknowledgments:

Ezra Acker.
Howard Acker.
Dr. G. S. Agersborg.
R. C. Alexander.
C. K. Averill.
Dr. W. C. Avery.
Vernon Bailey.
A. Baker.
W. B. Barrows.
A. R. Bellwood.
Capt. Charles Bendire.
H. C. Bennett.
G. E. Beyer.
R. H. Blain.
C. S. Brimley.
H. Broughton, jr.
E. L. Brown.
Herbert Brown.
William Brown.
F. L. Burns.

J. E. Byington.
J. L. Camp.
F. M. Chapman.
A. Chichister.
Hubert L. Clark.
G. A. Coleman.
W. C. Colt.
William Couper.
F. F. Crevecœur.
F. T. Cuthbert.
E. O. Damon.
L. M. Davies.
J. L. Davison.
F. J. Dixon.
William F. Doertenbach.
Freeman Douglas.
William Dutcher.
Jonathan Dwight, jr.
L. W. Dykeman.
H. N. Edwards.
Capt. Jesse Edwards.
W. B. Ellis.
E. A. Everett.
F. D. Figgins.
W. K. Fisher.
George Flick.
A. A. Frazer.
J. W. Gardner.
Dennis Gale.
E. Gerholtz.
H. J. Giddings.
M. M. Green.
C. C. Hanmer.
G. Hart.
E. M. Hasbrouck.
A. H. Hawley.
J. H. Hendrickson.
W. F. Hendrickson.
H. W. Henshaw.
Frank H. Hitchcock.
A. H. Howell.
Walter Hoxie.
H. K. James.
C. A. Keeler.
Noah King.
Gustave Kohn.
Mrs. F. E. B. Latham.
N. T. Lawrence.
W. G. W. Leizear.
C. J. Lemen.
J. B. Lewis.
W. A. Lewis.
Clifford Libby.
William Lloyd.
A. W. Lord.
J. Alden Loring.
F. A. Lucas.
H. W. McBride.
R. C. McGregor.
Alf Marshall.
Dr. C. Hart Merriam.
G. S. Miller, jr.
H. H. Miller.
J. Percy Moore.
A. H. Norton.
R. H. Norton.
T. S. Palmer.
William Palmer.
F. E. Parsons.
F. S. Place.
E. A. Preble.
Dr. M. W. Raub.
C. B. Ressell.
C. W. Richmond.
Robert Ridgway.
C. B. Riker.
Dr. William C. Rives.
W. F. Roberts.
Thomas Rowland.
John H. Sage.
W. E. Saunders.
Louis P. Scherrer.
Miss Mathilda Schlegel.
Robert R. Scorso.
J. M. Shaffer.
M. Smedley.
Dr. Hugh M. Smith.
R. W. Smith.
F. Stephens.
Dr. C. W. Stiles.
Benjamin Still.
F. S. Stratton.
E. E. Thompson.
R. J. Thompson.
James R. Thurston.
W. E. Clyde Todd.
Willard E. Treat.
F. C. Trowbridge.
B. G. True.
Dr. T. S. Turner.
Dr. B. H. Warren.
F. S. Webster.
C. M. Weed.
H. G. White.
William M. Whitfield.
Otto Widmann.
F. S. Wilder.
A. H. Wood.

SWALLOW-TAILED KITE.

Elanoides forficatus.

[Plate 1—Two adults.]

The Swallow-tailed Kite is an inhabitant of the tropical and warmer portions of America, extending north in the United States regularly to Iowa, Minnesota, Illinois, Kentucky, and Virginia, and west to the Great Plains. It has occurred casually in Pennsylvania, New York, southern New England, and Ontario. In the United States the species is most abundant in the States bordering the Gulf, but becomes more and more uncommon toward the limits of its range at the north. Although a few birds may occasionally remain in southern Louisiana and Texas, and regularly in southern Florida, the majority cross our southern border about the 1st of October to spend the winter in Central and South America, and are not seen again until the 1st of the following April. A most extraordinary exception to this usual migration is given by Dr. C. E. McChesney, who found the species near Fort Sisseton, S. Dak., during nearly the whole winter of 1877–'78. (Bull. Nutt. Ornith. Club, vol. III, 1878, p. 147.) On November 17, 1881, Mr. D. H. Talbot saw a flock of fifty or more between Jamestown and Bismarck, N. Dak. (Bull. Nutt. Ornith. Club, vol. VII, 1882, p. 59.)

The principal food of this Kite is small snakes, lizards, frogs, and various kinds of insects. It never molests small mammals or birds. Among insects it is especially fond of wasp larvæ, grasshoppers, and dragon flies; and its power to change the direction of flight is most markedly shown in capturing the latter insects, for in its efforts to secure them it is often necessary for it to turn almost completely over in its evolutions.

In Florida Dr. C. Hart Merriam often saw these Kites dart down and pick a wasp's nest from the under side of a leaf of some high palmetto and fly off with it, devouring, while on the wing, the grubs it contained. (Am. Nat., vol. VIII, 1874, p. 88.)

Mr. H. Nehrling speaks of the birds' food in Texas as follows: "In August and September the birds are often seen in cotton fields, where they feed on cotton worms and other insects. They are particularly fond of small snakes, such as *Leptophis*, *Rhinostoma coccinea*, lizards (*Anolius carolinensis* and *Ameiva sex-lineata*). I have never seen them take a bird or a small quadruped." (Bull. Nutt. Ornith. Club, vol. VII, 1882, p. 173.)

Audubon speaks of frequently seeing them with long slender snakes hanging from their talons. The following is his account of an examination of two stomachs collected in Texas: "In the stomach [of one bird] are six snakes, of a very slender form, and light-green color, one of them 22½ inches in length, together with one large larva, 3 inches long, and two coleopterous insects. Some of the snakes have been swallowed whole,

SWALLOW-T

Milvus forficatus

although bruised, the rest broken into large pieces several inches long. * * * In another male shot in the same country, on the same day, the stomach contained a slender snake 19 inches long, six lizards, and four beautiful, very large coleopterous insects, with two eggs of reptiles 7½ twelfths long." (Ornith. Biography, vol. v, pp. 372–374.)

Mr. Henshaw informs me that he found these Kites common on the Miami River, southeast Florida, and frequently saw them in mid air feeding upon snakes, which appeared to be their favorite food in that locality.

Glancing over the bill of fare of this Kite, it will at once appear that while there are many of the rapacious birds which perform greater service to the farmers in the destruction of his foes, there are few which are less injurious. The snakes, lizards, and frogs it destroys, though by no means injurious to agriculture, probably will be regretted by few, while the insect food, especially the grasshoppers and cotton worms, not only can be spared, but their destruction may be considered a positive benefit.

It probably breeds in suitable localities throughout its range, even to the northern limit. Its nest has been taken in Minnesota, and according to a very interesting note by Mr. Austin F. Park, it is very probable that a pair bred in Rensselaer County, N. Y., in 1886. (The Auk, vol. III, p. 484.) In the southern part of the United States this species begins to breed about the last of April or first of May, while farther north it is past the middle of the latter month before a full complement of eggs is deposited. The nest is situated in the tops of the tallest trees and is placed among the smaller branches, where it is well hidden by the thick foliage. Occasionally it is built toward the end of a large limb, 20 feet or more from the main trunk, the supporting branch usually being not more than a few inches in diameter. The nest oftentimes is a rude structure, made of sticks only, and resembles closely in appearance that of some of the herons, while others are more substantial, from the lining of Spanish moss or soft inner bark of the cottonwood which they contain; rarely a nest is composed almost entirely of Spanish moss.

The number of eggs in a set is usually two, though three, four, and probably even more are sometimes deposited. Audubon found a nest near the Falls of the Ohio, in 1820, which contained four young. The male is very attentive and assists the female in building the nest and incubating the eggs, as well as in collecting a large proportion of the food for the young. After the breeding season this Kite is more or less gregarious; families of four or five are usually found together and occasionally flocks of fifty or more. This species is quite wary and difficult to approach, but if one of a flock is killed or wounded the others will fly around it, and a number may be secured before they take alarm and move off.

The flight is smooth and protracted, and for grace and elegance is not excelled by that of any other species. To fully appreciate its superiority one must see the bird on the wing, for no language can describe the beauty of the ever-varying movements. No matter whether the bird is soaring far above the earth, skimming lightly over its surface, or following the different gyrations of some fleeting insect, the observer is surprised as well as charmed at the wonderful exhibition. Often it will stop in mid air, and with half-closed wings and depressed tail shake itself much after the manner of swallows while bathing. Although it often alights on trees it rarely is seen on the ground, and even when capturing its prey it glides swiftly over the surface, reaching down at the proper moment to secure the quarry. It generally, if not always, feeds while in mid air, bending its head downward and toward the talons to tear the object in its grasp. It drinks while skimming rapidly over the surface of the water as do the swifts, swallows, and many other birds.

DESCRIPTION.

Tail deeply forked, the outside feathers being more than twice as long as the middle pair; wings very long, narrow, and acute.

Color: Head, neck, lower parts, under wing feathers, and band across rump, pure white; back, wings, and tail glossy blackish.

Length: 19.50 to 25.50 inches (495 to 647 mm); extent 45 to 50 inches (1143 to 1270 mm); wing 15.50 to 17.75 inches (393 to 451 mm); outer tail feathers 12.50 to 14.50 inches (317 to 368 mm).

Table showing the results of examinations of 6 stomachs of the Swallow-tailed Kite (Elanoides forficatus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Hawkinsville, Fla.	Mar. 31, 1885				Lizard, grasshoppers, tree toad, beetles.
Do	do				Lizard, grasshoppers, beetles.
Dixon County, Nebr.	June, 1865				60 locusts, 5 other insects.
Do	do				69 locusts, 3 other insects.
Sarpy County, Nebr.	Sept., 1873				75 insects.
Woodville, Minn.	April 28, 1888				Beetle, wasp.

SUMMARY.—Of 6 stomachs examined all contained insects; 2, lizards; 1, tree-frog.

MISSISSIPPI KITE

mississippiensis (Wils.)

WHITE-TAILED KITE.

Elanus leucurus.

The White-tailed Kite inhabits the tropical and subtropical portions of America, except the West Indies, and extends north into the United States regularly to about latitude 38° along the Pacific coast, and to 35° in the central and eastern portions. A few probably winter in Louisiana and Texas, while the species is a regular resident in the southern part of California, though, strange to say, it has never been recorded from Arizona or New Mexico.

The food of this Kite, like that of the swallow-tailed, consists of small snakes, lizards, frogs, and such insects as grasshoppers and beetles. Audubon states that he found the remains of birds in two stomachs he examined, which is an experience no other naturalist has shared with him so far as known.

About the first of April it begins to remodel its old nest or that of some other bird, or builds a new one. The structure is usually placed among the slender branches in the top of some lofty sycamore or live oak, in the vicinity of water. It is flat, with a very shallow concavity, and is composed of small sticks, with an occasional lining of grass. By the middle of April full complements of eggs are usually to be found; these vary from three to five in number.

In the United States it is said to live in pairs or small families but never singly, though in South America Mr. W. B. Barrows informs me he never saw more than one at a time. It frequents the lowlands, where it rapidly beats back and forth over the surface of the ground, ever ready to seize its prey. The species is tame and unsuspicious, and may be approached without difficulty. Its flight is very much like that of the Mississippi Kite, but usually is not so protracted, nor does the bird attain such an elevation as the latter species.

DESCRIPTION.

Front of bare leg covered with minute roundish scales; claws not grooved beneath.

Color: Above, pale bluish gray, becoming gradually white on head and tail; shoulders and a spot in front of the eyes black; below, entirely pure white.

Length: 15 to 16.75 inches (380 to 425 mm); extent, 39 to 42 inches (990 to 1066 mm); wing, 11.50 to 13.50 inches (292 to 342 mm); tail, 5.90 to 7.40 inches (150 to 188 mm).

Table showing the results of an examination of 1 stomach of the White-tailed Kite (Elanus leucurus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Stockton, Cal				Meadow mouse	

MISSISSIPPI KITE.

Ictinia mississippiensis.

[Plate 2—Adult.]

The Mississippi Kite, like the other American species, inhabits the more southern parts of our territory. It is distributed from Guatemala north through eastern Mexico and the southern United States east of the Rocky Mountains, occurring regularly as far north as Georgia, southern Illinois, Indian Territory, and Kansas, and casually to Iowa and Wisconsin. A few remain in the southern United States all winter, but the greater part pass on to Mexico during October, and return again in the latter part of April.

The food of this species, like that of the Swallow-tailed Kite, consists of insects, such as the larger beetles, grasshoppers, and locusts, lizards, small snakes, and frogs. It never has been known to molest birds or mammals, except to drive the larger species away from the vicinity of its nest. Three specimens which Wilson examined at Natchez, Miss., contained the remains of beetles; and he saw them flying about the trees feeding on cicadas. Dr. Coues mentions one shot at Bluffton, S. C., whose stomach was crammed with the same insects, together with a few katydids. It is wonderful at what a distance its keen eyes can detect a comparatively small insect. Mr. E. W. Nelson says: "I saw them repeatedly dart with unerring aim upon some luckless grasshoppers from an elevation of at least 100 yards." (Bull. Essex Inst., vol. IX., 1877, p. 58.)

As regards the economic value of this Kite much the same statement may be made as of the previous species. It does little or no damage, but much good. Soon after arriving in its summer home it begins to remodel its old nest or the deserted nest of some other bird, and more rarely, when these are not available, it builds a new one. The remodeling consists in patching up the sides with a few sticks and adding a sparse lining of Spanish moss or green leaves. The nest is usually situated in the tops of the tallest trees, among the smaller branches, where it is well concealed by the foliage. The full complement of eggs, usually two or three in number, is deposited by the middle of May, though in some cases it must be much earlier, for the writer once secured a young bird in southern Louisiana the last of May which already had acquired nearly the adult plumage.

This Kite is not at all shy, and may be secured easily as it sits on some tall stub; in fact, Col. N. S. Goss tells of shooting a pair from the same tree, as the second one did not move at the report of the gun, but looked down with surprise on its fallen companion. It is said to be morose and irritable in captivity and very difficult to tame. A specimen which the writer once wounded was the very picture of rage as with flashing eyes and erect crest it threw itself on its back and prepared to repel the aggressor with its talons.

This species is fully as gregarious as any of the other Kites, and often times may be seen in flocks of twenty or more circling over a favorite hunting ground. It is observed most frequently around the border of woods in the vicinity of water, and is particularly fond of half-cleared ground where dead trees still stand, these being used for perches.

Its flight is as varied and graceful as that of the Swallow-tailed Kite, is long protracted, and the bird often ascends to so great a height as to be barely visible. While soaring high in the air its flight simulates that of the turkey buzzard very closely, and as the two birds often are seen together the Kite looks like a miniature of the other.

DESCRIPTION.

Front of bare leg covered with large transverse scales; cutting edge of upper bill notched.

Color: Uniform bluish gray or lead color, becoming lighter on head and darker on wing and tail; inner webs of outer wing feathers partly rufous.

Length: 13 to 15.50 inches (330 to 393 mm); extent, 35 to 37 inches (890 to 940 mm); wing, 10.60 to 12.30 inches (269 to 312 mm); tail, 6 to 7 inches (152 to 178 mm).

Table showing the results of examinations of 4 stomachs of the Mississippi Kite (Ictinea mississippiensis).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Madisonville, La	May 29, 1886				Fragments of insects.
Do	May 30, 1886				Beetles.
Breckenridge, Tex	May 5, 1889				Grasshoppers, beetles, other insects.
Ponca Agency, Okla	Aug. 5, 1892				5 katydids, 3 grasshoppers, 1 cricket.

SUMMARY.—Of the 4 stomachs examined all contained insects.

EVERGLADE KITE.

Rostrhamus sociabilis.

This Kite inhabits the whole of tropical America, excepting parts of the West Indies, and passes our southern border into Florida only. Through many parts of the everglades this bird is common, generally associating in flocks of from five to eight or ten individuals.

Its food, as far as known, consists exclusively of fresh-water univalve mollusks, which it finds among the water plants at the edges of shallow lakes and rivers or the overflowed portions of the everglades. The species it feeds on in Florida (*Ampullaria depressa*) is of moderate size, the shell being 2 or 3 inches in diameter, and is very abundant in suit-

able localities through the middle and southern parts of the State. When the bird has captured one of these mollusks it flies to the nearest perch and removes the meat from the shell with apparent ease and without injuring the latter. While collecting food it often secures five or six before returning to the nest, keeping in its gullet the parts it has extracted for the young.

So far as at present known the Everglade Kite can not be said to have any economic value, since the mollusk, which appears to constitute its sole food, does not seem to be in any way injurious. If not positively beneficial, however, it at least may be claimed for this kite that it does absolutely no injury to man, and consequently should never be wantonly destroyed.

By the first of March, or in some cases a little sooner, it begins to build. The nest is usually situated in some low bush or among a dense growth of saw grass, rarely if ever more than a couple of feet above the water. It is a flat structure, often composed of small sticks loosely placed together and sometimes receives an incomplete lining of dry saw grass. The eggs are two or three in number, two being more common. It is a very unsuspicious bird and may be approached easily while on a perch, or may pass within close range of a person as it beats over the meadows. Its flight is said to resemble more closely that of the Marsh Hawk than that of any other of the rapacious birds.

DESCRIPTION.

Upper part of bill forming a slender lengthened hook. Five outer wing feathers cut out on the inner web.

Color: Uniform slate color, becoming nearly black on outer wing feathers and tail; head and neck with more or less of a chalky cast; base of tail and feathers covering it, white.

Length: 16 to 18 inches (406 to 457 mm); extent, 44 to 46 inches (1117 to 1168 mm); wing, 12.90 to 14.25 inches (328 to 362 mm); tail, 7.20 to 8.50 inches (182 to 216 mm).

MARSH HAWK.

Circus hudsonius.

[Plate 3—Adult male, immature female.]

This well-known hawk inhabits the whole of North America, breeding north to Alaska and the fur countries, and wintering from about latitude 40° N., southward to Panama and Cuba. A representative species (*Circus cyaneus*) occurs throughout most of temperate Europe and Asia, wintering in the more southern portions as well as in northern Africa.

The Marsh Hawk breeds in suitable localities everywhere from the southern border of the United States to the northern limits of its range, but is most common through the prairie country of the West. In the

MARSH HAWK

cyaneus Linn.

case of a species of such extended distribution the time of nesting is very variable. Thus while in Texas the eggs are to be found by the latter part of April, in the fur countries it is the middle of June before they are deposited.

The nest is always placed on the ground, usually in a marsh or prairie grown up with tall rushes, grass, or bushes, and not far from water. It is commonly situated at the base of a bush, or, in localities subject to inundation, on the top of a tussock. It is composed chiefly of dry grass loosely thrown together and strengthened by the incorporation of a few dead sticks, and as a finishing touch a sparse lining of feathers is added. When the same site is used for several years in succession the accumulated mass of material often forms a platform of considerable size.

The number of eggs in a set is usually from four to six, though as many as eight have been found. As with most of the hawks, the period of incubation is nearly four weeks. The male assists the female in the construction of the nest, in incubating the eggs, and in procuring food for the young. During the period in which the young are being fed the male often drops the food to the female from a considerable height, as he passes near the nest, she darting upward and catching it before it reaches the ground.

This hawk is very zealous in protecting its young from intruders and has been known to attack persons or dogs who have entered its domain. After the young are reared and leave the nest they remain together, and as fall advances several families unite and migrate southward. Hence it is not unusual to see forty or fifty individuals at one time scattered over the more extensive marshes.

Though the flight of this hawk lacks the elegance of some of the other species, it is well sustained and often protracted. When the bird is beating back and forth over the meadows in search of food the flight is easy, regular, but not rapid, and resembles closely that of some of the herons. In the spring the male sometimes goes through a series of aërial evolutions which are highly amusing. While at a considerable altitude it throws its wings over its back, and falling several yards turns over and over much like a tumbler pigeon until near the ground, when it ascends rapidly again to repeat the performance.

When prey is discovered the hawk poises for a moment over the spot and then drops quickly on it, and if unsuccessful is sure to beat over the same place before leaving. It generally devours its quarry on or near the spot where captured, instead of carrying it away. Its food consists largely of small rodents, such as meadow mice, half-grown squirrels, rabbits, and spermophiles or ground squirrels. In fact, so extensively does it feed on the last-named animals that the writer rarely has examined a stomach from the West which did not contain their remains. In addition to the above it preys upon lizards, frogs, snakes, insects, and birds; of the latter, the smaller ground-

dwelling species usually are taken. When hard pressed it is said to feed on offal and carrion; and in spring and fall, when water fowl are abundant, it occasionally preys upon the dead and wounded birds left by gunners. It seldom chases birds on the wing, though the writer has seen it do so in a few instances.

In speaking of the food of the Marsh Hawk, Audubon says: "The food of the Marsh Hawk consists of insects of various kinds, especially crickets, of small lizards, frogs, snakes, birds, principally the smaller sorts, although it will attack partridges, plovers, and even green-winged teals, when urged by excessive hunger." (Ornith. Biography, vol. IV, p. 400.)

Mr. H. W. Henshaw, whose great field experience in the West enables him to speak authoritatively on the subject, says: "They were seen at all hours of the day * * * in search of mice and gophers, which, when obtainable, constitute the major part of its food. When urged by hunger, it may attack birds; and I remember to have been once robbed of a widgeon I had killed and kept lying in the water, by one of these birds; but generally they confine their attacks to the humblest kind of game, which possess neither the strength to enable them to resist nor the activity to evade the sudden descent of their winged enemy." (Ornith. 100 Merid., 1875, p. 416.)

Dr. Coues says: "It ordinarily stoops to field mice, small reptiles, and insects. It is particularly fond of frogs." (Birds of the Northwest, p. 331.)

Mr. Ridgway, in the Ornithology of the Fortieth Parallel (p. 580), states that the stomachs and crops of specimens killed at Pyramid Lake, Nev., were filled to their utmost capacity with the remains of small lizards, and nothing else.

Dr. B. H. Warren gives the following summary of his investigations on this species: "In fourteen examinations made by myself, seven hawks had only field mice in their stomachs; three, frogs; two, small birds (warblers); one, a few feathers, apparently of a sparrow (*Melospiza*), and fragments of insects; one, a large number of grasshoppers, with a small quantity of hair, undoubtedly that of a young rabbit." (Birds of Pennsylvania, 1888, p. 75.)

There is another way in which it protects crops, albeit unconsciously, as appears from the following: "It is also said to be very serviceable in the Southern rice-fields in interrupting the devastations made by swarms of bobolinks. As it sails low and swiftly over the fields it keeps the flocks in perpetual fluctuation and greatly interrupts their depredations. Wilson states that one marsh hawk was considered by the planters equal to several negroes for alarming the rice-birds." (Hist. N. A. Birds, vol. III, p. 218.)

Dr. Merriam bears witness to the truth of the foregoing, for while at Georgetown, S. C., he saw an immense flock of bobolinks driven from a field by one of these hawks, which simply passed over at a considerable height, and made no movement to molest them.

Although this Hawk occasionally carries off poultry and game birds, its economic value as a destroyer of mammal pests is so great that its slight irregularities should be pardoned. Unfortunately, however, the farmer and sportsman shoot it down at sight, regardless or ignorant of the fact that it preserves an immense quantity of grain, thousands of fruit trees, and innumerable nests of game birds by destroying the vermin which eat the grain, girdle the trees, and devour the eggs and young of the birds.

The Marsh Hawk is unquestionably one of the most beneficial as it is one of our most abundant Hawks, and its presence and increase should be encouraged in every way possible, not only by protecting it by law, but by disseminating a knowledge of the benefits it confers. It is probably the most active and determined foe of meadow mice and ground squirrels, destroying greater numbers of these pests than any other species, and this fact alone should entitle it to protection, even if it destroyed no other injurious animals.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.

Arvicola riparius.
Arvicola pinetorum.
Thomomys.
Spermophilus 13-lineatus.
Spermophilus 13-lineatus pallidus.
Spermophilus mollis.
Neosorex.
Sigmodon.
Lepus sylvaticus.
Tamias minimus.
Sorex.
Blarina exilipes.
Mephitis.
Sciurus hudsonicus.
Perodipus ordii.

BIRDS.

Charitonetta albeola.
Rallus virginianus.
Rallus crepitans.
Philohela minor.
Colinus virginianus.
Quiscalus quiscula.
Poocætes gramineus.
Ammodramus s. savanna.
Ammodramus lecontei.
Ammodramus s. passerinus.
Spizella monticola.
Spizella pusilla,
Spizella socialis.
Junco hyemalis.
Passerina cyanea.
Melospiza fasciata.
Melospiza georgiana.
Passer domesticus.
Merula migratoria.
Mimus polyglottos.

DESCRIPTION.

Face encircled by a ruff of short compact feathers, as in the Owls.

Adult male.—Mostly of a uniform light bluish gray streaked with white; tail barred with six to eight bands, the one nearest the end being broader and darker; tips of the wings blackish.

Female and immature.—Dusky or rusty brown, more or less streaked on head and neck. The Marsh Hawk may be easily distinguished in any plumage by the large white patch on the rump.

Length: 19.50 to 24.00 inches (495 to 610mm); extent, 40.00 to 45.00 inches (1016 to 1143mm); wing, 12.90 to 16.00 inches (328 to 406mm); tail, 8.80 to 10.50 inches (223 to 267mm).

Table showing the results of examinations of 124 stomachs of the Marsh Hawk (Circus hudsonius).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Amityville, L. I., N. Y.	Oct. 17, 1885			Meadow mouse.	
Washington, D. C	Oct. 29, 1886			3 meadow mice.	
Bergen County, N. J.	Nov. 26, 1885			Meadow mouse.	
Washington, D. C	Jan., 1887			....do	
Sandy Spring, Md	Feb. 11, 1887		Junco		
Do	Oct. 2, 1887			Meadow mouse.	
Do	Oct. 14, 1887			....do	
Do	Nov. 17, 1887			2 pine mice, 2 meadow mice.	
Do	Nov. 18, 1887		Tree sparrow	Pine mouse, 2 meadow mice.	
Do	Nov. 23, 1887			Meadow mouse.	
Travare, S. Dak	July 5, 1887			2 striped gophers.	
Pembina, N. Dak	July 30, 1887			Striped gopher.	
Do	....do			Hair of striped gopher.	
Do	....do			Striped gopher.	
Oakdale, N. Y	Oct. 4, 1887			Shrew	
Long Island City, N. Y.	Oct. 18, 1887			2 meadow mice.	
East Hartford, Conn	Sept. 17, 1887	Duck			
Cromwell, Conn	Oct. 5, 1886			Meadow mouse.	
Devils Lake, N. Dak	Aug. 11, 1887			Striped gopher.	
Do	Aug. 17, 1887			Meadow mouse.	
Sandy Spring, Md	Oct. 17, 1887			....do	
Do	Feb. 13, 1887				Empty.
Sing Sing, N. Y.	Oct. 1, 1881	Fowl			
Do	Sept. 17, 1882		Small bird		
Wethersfield, Conn	Sept. 17, 1887			Mice	
Do	Sept. 24, 1887		Small bird	....do	
East Hartford, Conn	Nov. 12, 1886			3 meadow mice.	
Do	Oct. 17, 1886			2 meadow mice.	
Paint Rock, Tex	Dec. 7, 1886			Skunk	
Washington, D. C	Sept. 11, 1886	Fowl			
East Bradford, Pa	Aug. 22, 1878			Mice	
Westtown, Pa	Aug. 30, 1878		2 warblers	....do	
Oxford, Pa	Nov. 5, 1879			....do	
Brazile Creek, Nebr	Oct., 1869				Reptiles, 69 insects.
Do	....do				15 locusts, 77 other insects.
Otoe County, Nebr	Sept., 1864				71 locusts, 10 other insects.
Sarpy County, Nebr	....do				Lizard, 69 locusts.
Do	....do			Gopher	51 locusts.
Douglas County, Nebr.	Oct., 1864				Lizards, 43 locusts.
Elmira, N. Y	May 7, 1886			4 mice	
Do	July 11, 1886			Mouse	Beetles.
Tyrone, N. Y	Aug. 17, 1886			Red squirrel	
Do	....do			Field mice	
Barton, N. Y	Aug. 1, 1886	Woodcock.			Beetles.
Hale County, Ala	Mar. 17, 1888	Quail			
Washington, D. C	Mar 28, 1888			Meadow mouse.	
Kalamazoo, Mich	Nov. 28, 1886			Field mouse	
Do	Apr. 20, 1886			Mouse	
Hollis, N. H					Striped snake.
Concord, Mass					Do.
Montauk Pt., L. I., N. Y	Sept. 4, 1885				Frogs.
Do	Sept. 11, 1885		Robin	Moles (?)	
Hackensack, N. J	Sept. 24, 1885			Mice	
Schraalenburg, N. J	Nov. 26, 1885				Insects.
Jackson County, Mo	Dec. 22, 1883		Birds		
St. Helena Island, S. C.	Jan. 1, 1886		Clapper rail		
Raleigh, N. C	Oct. 29, 1886			Meadow mouse.	
Do	Oct. 13, 1888		3 small birds	3 mice	
Do	Oct. 22, 1888		1 sparrow		
Brookville, Ind	Nov. 22, 1885			2 meadow mice.	
Saratoga County, N. Y.	Sept. 1, 1877		Sparrow	Mouse	
Rensselaer County, N. Y.	Aug. 9, 1879			Meadow mouse.	

Table showing the results of examinations of 124 stomachs of the Marsh Hawk (Circus hudsonius)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Rensselaer County, N. Y	Sept. 10, 1883		4 sparrows	Meadow mouse.	
Do	Aug. 26, 1885				Grasshoppers.
Do	Aug. 27, 1855		Thrush		
Do	Aug. 30, 1886			Squirrel	
Albany County, N. Y	Apr. 10, 1885			Mouse	
Do	May 30, 1884			Meadow mouse	
Do	Nov. 8, 1886		Small birds		
New York	Sept., 1886		Sparrow	Mice	
Oakdale, Suffolk County, N. Y.	Mar. 23, 1888			2 meadow mice	
Do	Apr. 24, 1888		Purple grackle		
Peterboro, N. Y	July 9, 1887		2 Savanna (?) sparrows.	1 meadow mouse	
Sandy Spring, Md	Oct. 29, 1888			3 meadow mice	
Cheyenne, Wyo	Aug. 21, 1888			Striped gopher	
Do	Aug. 22, 1888		Leconte's (?) sparrow.		
Do	Aug. 23, 1888				Grasshopper.
Fort Bridger, Wyo	Sept. 15, 1888				Frog.
Stratford, Conn	Sept. 21, 1888		Savanna sparrow	Meadow mouse	
Fairmount, W. Va	Sept. 14, 1888		Chipping sparrow.		
Oakdale, Suffolk County, N. Y.	Sept. 11, 1888		Chipping sparrow (?).		
Flatbush, Kings County, N. Y.	Sept. 29, 1888			8 meadow mice	
Long Island City, N. Y.	Sept. 22, 1888			2 meadow mice	
St. George, Utah	Jan. 4, 1889	Feathers of water fowl.		Rabbit hair	
Rayne, La	Feb. 24, 1889			do	
Sabine Station, La	Feb. 27, 1889				Snake.
Sandy Spring, Md	Aug. 28, 1889		Indigo bird		
Greensboro, Ala	Sept. 17, 1889		Mockingbird, field sparrow.		2 six-lined lizards, 1 grasshopper.
Stratford, Conn	Sept. 8, 1889		Song sparrow, swamp sparrow.		
Del Rio, Tex	Jan. 31, 1890			Cotton rats, rabbits.	
Circleville, Ohio	Dec. 7, 1881			Meadow mice	
Camp Verde, Ariz	Aug. 27, 1884	Poultry			
Do	Sept. 20, 1884		Small birds		
Mouth San Carlos River, Arizona.	Oct. 18, 1884			Small mammal	
Stones Lake, Arizona	Nov. 8, 1884				Empty.
Do	do				Do.
Do	do				Do.
Do	Sept. 11, 1884				Do.
Do	Dec. 5, 1885			Pocket gopher	
Camp Verde, Ariz	Apr. 16, 1887			Kangaroo rat, pocket gopher.	
Birch Creek, Idaho	Aug. 4, 1890		Feathers	Water shrew	
Do	do			Short-tailed spermophile.	
Clay County, S. Dak	Sept. 21, 1889				Empty.
Do	Oct. 1, 1889				Indeterminate matter.
Sandy Spring, Md	Oct. 6, 1890			Meadow mouse	
Lembi Valley, Idaho	Sept. 6, 1890			Chipmunk	
Portland, Conn	Oct. 1, 1890			2 meadow mice	
Do	Oct. 14, 1890		2 swamp sparrows.	do	
Sandy Spring, Md	Dec. 2, 1890			3 meadow mice	
Morristown, N. J	Sept. 23, 1890			5 meadow mice	
Do	Sept. 26, 1890			1 meadow mouse	
Do	Oct. 3, 1890		Field sparrow, song sparrow.	3 meadow mice	
Union County, Ky	Oct. 11, 1890		Grasshopper sparrow.	1 meadow mouse.	
Amityville, N. Y	Mar. 8, 1890		Savanna sparrow.	2 meadow mice	
Sandy Spring, Md	Nov. 5, 1891			3 meadow mice, shrew.	
Buffalo, N. Y	Sept. 22, 1890			1 meadow mouse.	1 beetle.
Westbrook, Me	Apr. 12, 1890		2 vesper sparrows.		
Sandy Spring, Md	Dec. 10, 1891		English sparrow		

Table showing the results of examinations of 124 stomachs of the Marsh Hawk (Circus hudsonius)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Harrison, S. Dak	Sept. 2, 1891				Empty.
Do	...do				11 crickets, 1 grasshopper.
Do	Oct. 1, 1891			Meadow mouse.	
Portland, Conn	Sept. 28, 1891		Field sparrow		
Spiritwood, N. Dak	July 1, 1892				Empty.
Onaga, Kans	May 15, 1892		Virginia rail, young hawk.		

SUMMARY.—Of 124 stomachs examined, 7 contained poultry or game birds; 34, other birds; 57, mice; 22, other mammals; 7, reptiles; 2, frogs; 14, insects; 1 indeterminate matter, and 8 were empty.

SHARP-SHINNED HAWK.

Accipiter velox.

[Plate 4—Adult.]

The Sharp-shinned Hawk, one of the commonest and best known of our birds of prey, has an extensive distribution. It breeds in most, if not all, of the States and in the British Provinces, as far north as the Arctic circle. In winter it is found from about parallel 40° N., southward to Guatemala. In the latter part of September and the first of October it migrates through the Middle States in vast numbers. In southern New York the writer has seen several hundred during a day's tramp, the majority high in the air, though a few were flying low in search of food. The northward migration in spring, in the same locality, takes place during the latter part of March and first of April.

The food of this daring little Hawk is made up almost entirely of wild birds and young poultry, though occasionally it will take a few insects, mice, reptiles, or batrachians. Out of nineteen specimens examined by Dr. B. H. Warren, seventeen contained remains of poultry or wild birds. From this data and from an examination of our more extended table it will be seen how universal this class of food is. The following quotation from Audubon shows the variety of its bill of fare:

"The food of this hawk consists chiefly of birds of various sizes, from the smallest of our warblers to the Passenger Pigeon and young chicken, the latter appearing to afford a special temptation to it, as has been above related. I am also aware that it feeds occasionally on small reptiles and insects, and I shot the male represented in the plate, on wing, whilst it held in its claws the small Shrew also represented." (Ornith. Biography, vol. IV, p. 526.)

When a pair of Sharp-shinned Hawks find a farm where young chickens are easily obtained, they generally visit it until the supply gives out, or they themselves meet a tragic death. Nuttall speaks of a single bird which came every day to a farmhouse until it had carried away between twenty and thirty young chickens.

SHARP SHINNED HAWK

velox (Wils.)

Mr. William Lloyd, writing from western Texas, says that he has seen it fly away with a pullet as big or bigger than itself, and so heavy that the legs dragged the ground. (Auk, vol. IV, 1887, p. 188.)

In times past when the wild pigeon was common, this little hawk caused great annoyance as well as loss to trappers. While standing in the bow-house scanning the horizon for an incoming flock, the man on watch would suddenly be startled by the violent fluttering of his 'stool pigeon' or of one of the 'fliers,' and upon looking around would find one of these little marauders fastened to the bird—a serious loss if he did not have a reserve pigeon, for hundreds might pass in easy hailing distance of his bow-house and still he would be powerless without the decoy. Many times has the writer stood near a bow-house and killed one of these Hawks which had been attracted to the spot from a considerable distance by the hovering stool pigeon. The following note from Mr. H. W. Henshaw shows that it is partial to this food in the West also:

"Upon one occasion, while watching a pair of doves feeding upon the ground, a female of this species made a daring and successful swoop upon one of them, passing within a few feet of the observer's head. As a further illustration of the bravery and hardihood with which this bird pursues its prey, it may be mentioned that one was observed in the town of Panquitch [Utah,] eagerly pursuing a common pigeon, apparently oblivious of the presence of spectators, who for some time vainly endeavored to drive it away." (Explor. West of the 100th Merid., Wheeler, vol. V, 1875, p. 417.)

Occasionally it will attack a bird many times its size, as the following quotation from Mr. Maynard demonstrates: "I once saw one strike down a fully-grown Night Heron that chanced to be abroad by day. * * * The slow-moving heron fell to the ground at once, but, fortunately for him, in falling he gave vent to one of those discordant squawks which only a bird of this species is capable of uttering, and which so astonished and frightened the hawk that it completely forgot to take advantage of its prostrate prey." (Birds of Eastern N. A., 1880, p. 304.)

Little can be said in favor of this Hawk although its daring, courage, and impudence are to be admired. On this and the two following species mainly rest the responsibility for the ill favor with which the other Hawks are regarded. A score of valuable species suffer because they belong to a class which includes two or three noxious kinds. However, like most villains, it has at least one redeeming quality, and that is its fondness for the English sparrow, our imported bird-nuisance. This Hawk is gradually learning that there is a never-failing supply of food for it in the larger towns and cities. The Sharp-shinned Hawk is not uncommon in Central Park, New York, all through the winter, where the writer has witnessed it chasing sparrows, as he has also in some of the larger parks in Washington, D. C. Numerous reports

from various towns and villages show that the habit of visiting such places for the sparrow is becoming common.

The following species of birds were positively identified among the stomach contents:

Callipepla gambeli.
Zenaidura macroura.
Dryobates pubescens.
Colaptes cafer.
Colaptes auratus.
Chætura pelagica.
Molothrus ater.
Icterus spurius.
Quiscalus quiscula.
Carpodacus m. frontalis.
Spinus tristis.
Ammodramus s. savanna.
Ammodramus s. alaudinus.
Zonotrichia albicollis.
Spizella pusilla.
Spizella socialis.
Spizella monticola.
Junco hyemalis.
Melospiza fasciata.
Passerella iliaca.
Passer domesticus.
Pipilo aberti.
Vireo olivaceus.
Dendroica maculosa.
Dendroica virens.
Dendroica coronata.
Dendroica castanea.
Dendroica striata.
Dendroica vigorsii.
Seiurus aurocapillus.
Geothlypis trichas.
Sylvania pusilla.
Sylvania p. pileolata.
Sylvania canadensis.
Mimus polyglottos.
Galeoscoptes carolinensis.
Harporhynchus crissalis.
Campylorhynchus brunneicapillus.
Thryothorus ludovicianus.
Sitta canadensis.
Parus atricapillus.
Regulus calendula.
Turdus aliciæ.
Turdus aonalaschkæ pallasii.
Merula migratoria.
Sialia sialis.

This little Hawk is one of the latest to commence nesting, laying its eggs when most of the other species have half-grown young. North of parallel 40° full complements of eggs are not found until the latter part of May, and early in June sets are often taken which are only slightly incubated. The nest, which is situated usually in a dense hemlock or other conifer, though occasionally in a deciduous tree, is rarely at any considerable height from the ground, 20 feet being a fair average. The bird is said to build sometimes in the crevices of cliffs or hollows of trees, but these sites must be considered exceptional. The nest is a large structure in proportion to the size of the bird, and is made of dry sticks more or less compactly placed together, with or without a sparse lining of soft inner bark or green leaves. It does not always construct its own nest, for it sometimes remodels the old nest of the crow, magpie, or even squirrel. The eggs are four or five in number, and are usually deposited on alternate days, though occasionally only on every third day. Among the *Raptores* the nest of this species is one of the easiest to find, as the parents invariably commence scolding as soon as an intruder enters their domain, even when the nest is being constructed.

The flight of the Sharp-shinned Hawk is swift, but irregular, often protracted, and is identical in character with that of the two following species. At times it passes rapidly along the fence rows or darts in

and out among the brier patches in search of small birds; at other times it may be seen passing over the country high in the air or soaring in wide circles over some particular spot.

DESCRIPTION.

Tail more than two-thirds as long as wing, its tip even or slightly notched; wing not more than 8.80 inches (223mm).

Adult.—Uniform bluish gray above, top of head darker, tail crossed by several blackish bands; below, white, with breast and sides barred dusky or rufous.

Immature.—Above, dusky more or less spotted with lighter, the feathers bordered with rusty; below, whitish, streaked with brown or dusky.

Length: 10 to 14 inches (254 to 355mm); extent, 21 to 25 inches (533 to 635mm); wing, 6 to 8.80 inches (152 to 223mm); tail, 5.80 to 8.20 inches (147 to 208mm).

Table showing the results of examinations of 159 stomachs of the Sharp-shinned Hawk (Accipiter velox).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sing Sing, N. Y.	Sept. 10, 1885				Empty.
Do	Sept. 17, 1885		2 warblers		
Do	do		Warbler		
Do	Sept. 24, 1885		Field sparrow		
Southold, N. Y.	Nov. 20, 1885		Chipping sparrow, purple grackle.		
Alfred Centre, N. Y.	Sept. 17, 1885		Warbler		
Taunton, Mass	Oct. 6, 1885		Goldfinch		
Do	Nov. 21, 1885		2 small birds		
Sing Sing, N. Y	Sept. 25, 1886		Junco and kinglet.		
Peterboro, N. Y.	July 22, 1886		Small bird		
Portland, Conn.	Mar. 27, 1886		Robin		
Maplewood, N. J.	May 25, 1886		Oriole, swift		
Montgomery Co., Pa.	Sept. 18, 1886		Small bird		
Woodstock, Conn	May 2, 1887		do		
Long Island City, N. Y.	Sept. 21, 1887		English sparrow, warbler.		
Greensboro, Ala	Nov. 11, 1887		White-throated sparrow.		
Middletown, Conn	Jan. 19, 1887		2 English sparrows.		
Portland, Conn.	Apr. 2, 1887		Robin		
Do	Oct. 20, 1887		Field sparrow		
Fort Buford, N. Dak.	Sept. 9, 1887		Thrush		
Washington, D. C	Dec. 31, 1887		White-throated sparrow.		
Sing Sing, N. Y	Apr. 7, 1880		Robin		
East Hartford, Conn.	Oct. 17, 1886		Warbler		
Easthampton, Mass	May 9, 1874		Junco		
South Windsor, Conn.	Nov. 4, 1887				Do.
Portland, Conn.	Nov. 8, 1886				Do.
Do	Feb. 4, 1881		Goldfinch, chickadee.		
Fort Buford, N. Dak.	Sept., 1887		Dove		
Sandy Spring, Md.	Apr. 23, 1887				Do.
Do	do				Do.
Do	do		Bluebird		
Do	Sept. 20, 1887				Do.
Do	Sept. 26, 1887		Small bird		
Do	Oct. 2, 1887				Do.
Do	Nov. 5, 1887				Do.
Do	Nov. 22, 1887				Do.
Chester County, Pa.	Nov. 26, 1886		Fox sparrow, song sparrow.		
Do	Sept. 20, 1884		Field sparrow		Beetles.

Table showing the results of examinations of 159 stomachs of the Sharp-shinned Hawk (Accipiter velox)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester County, Pa.	Sept. 28, 1880	Quail.			
Do	Sept. 10, 1874		English sparrow	Mice.	
Do	Oct., 1875		Small bird	do	
Do	Feb. 16, 1880			do	
Do	May 19, 1881	Poultry.			Insects.
Elmira, N. Y	Mar. 4, 1886		English sparrow	Mouse	
Do	Apr. 18, 1886		Small bird		
Big Flats, N. Y	Sept. 23, 1886		English sparrow		
Do	do				Indeterminate.
Gainesville, Fla	Dec. 22, 1887				Empty.
Sandy Spring, Md	May 3, 1888				Do.
East Hartford, Conn	Apr. 29, 1888	Chicken.	Chipping sparrow.		
Do	May 5, 1888		Robin	White-footed mouse.	
Do	Aug. 29, 1887		Song sparrow		
Do	Oct. 1, 1887		Yellow-rumped (?) warbler.		
Sandy Spring, Md	Sept. 13, 1888				Do.
Do	do				Do.
Do	Sept. 26, 1888		Warbler		
Carter Station, Wyo	Sept. 15, 1888		Sparrow		
Gallatin Station, Mont.	Sept. 9, 1888		do		
Sandy Spring, Md	Nov. 10, 1888				Do.
Buckhannon, W. Va	Aug. 3, 1888		Song sparrow		
Do	Aug. 13, 1888		Savanna sparrow.		
Fairmont, W. Va	Sept. 18, 1888		Goldfinch		
Rockaway Beach, L.I., N. Y.	Sept. 26, 1888		English sparrow		
Ogden, Utah	Oct. 11, 1888		House finch		
Cobourg, Canada	Aug. 30, 1888		Red-billed nuthatch.		
Sandy Spring, Md	May 1, 1889		Song (?) sparrow		
San Francisco Mountain, Ariz.	Aug. 13, 1889				Do.
Do	Aug. 27, 1889		Wilson's blackcap.		
Wellesley Hills, Mass	Sept. 27, 1889		2 blackpoll (?) warblers.		
Sandy Spring, Md	Oct. 14, 1889		Feathers		
Beaver, Pa	Aug. 1, 1889		Downy woodpecker.		
Schroon Lake, N. Y	Aug. 10, 1882		Small bird		
St. Helena Island, S. C	Dec. 26, 1884		Savanna sparrow		
Do	do				Grasshopper.
Bayou des Allemands, La.	Dec. 18, 1888			Mouse	Dragon flies.
Raleigh, N. C	Nov. 18, 1885				Empty.
Do	Dec. 2, 1885				Do.
Do	Oct. 7, 1886				Do.
Do	Dec. 10, 1886		2 sparrows		
Do	Mar. 21, 1888				Do.
Do	Aug. 17, 1888				Do.
Do	Oct. 3, 1888		1 sparrow		
Do	Nov. 12, 1888				Do.
Do	Dec. 5, 1888		Carolina wren		
Brookville, Ind	Dec. 7, 1886				Do.
Do	Dec. 19, 1886				Do.
Albany County, N. Y.	Jan. 5, 1882		Small bird		
Rensselaer County, N. Y.	July 24, 1884		Feathers		
Do	Sept. 15, 1886				Do.
Do	Oct. 11, 1886				Do.
Do	Aug. 7, 1887				Do.
Do	do				Do.
Do	do		Sparrow		
Do	May 20, 1888		Small bird		
Troy, N. Y	Sept. 11, 1885				Do.
Do	Jan. 30, 1887		Feathers		
Rensselaer County, N. Y.	Sept. 4, 1888		Flicker and small bird.		
Do	Sept. 30, 1888		Sparrow		
Do	Apr. 30, 1889		2 sparrows		
Troy, N. Y	Dec. 28, 1888		2 chickadees		
Gaylordsville, Conn	Apr. 15, 1889				Do.
Hale County, Ala	Nov. 9, 1889		Cowbird		
Sandy Spring, Md	Jan. 11, 1890				Do.
Do	Feb. 22, 1890		Fox sparrow, other sparrow.		

Table showing the results of examinations of 159 stomachs of the Sharp-shinned Hawk (Accipiter velox)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Long Island City, N. Y	Sept. 24, 1889		Snowbird		
Do	Oct. 5, 1889		Song sparrow		
Do	May 6, 1889		Robin		
Raleigh, N. C	Nov. 12, 1889				Empty.
Do	Dec. 24, 1889				Do.
Sandy Spring, Md	May 1, 1890		Yellowbird		
San Francisco Mountain, Ariz.	Aug. 19, 1889		Warbler		
Highland Falls, N. Y	Oct. 11, 1877				Do.
Garrisons, Putnam County, N. Y.	Apr. 28, 1877		Field sparrow		
Barnegat, N. J	Nov. 5, 1878		Field sparrow, other birds.		
Camp Verde, Ariz	May 1, 1884		Mocking bird		
Mogollon Mountains, Ariz.	Oct. 3, 1884				Do.
Globe City, Ariz	Oct. 20, 1884		Cactus wren		
Ash Fork, Ariz	Nov. 6, 1884				Do.
Camp Verde, Ariz	Dec. 15, 1884				Do.
Yavapai County, Ariz	Jan. 15, 1885				Do.
Camp Verde, Ariz	Oct. 10, 1885	Gambel's quail.			
Do	do	do			
Do	Dec. 23, 1885		Small birds		
Do	Jan. 5, 1886	Gambel's quail.			
Do	Apr. 4, 1886				Do.
Do	Apr. 8, 1886		Crissal thrasher		
Do	Nov. 1, 1886		Mourning dove		
Do	Dec. 30, 1886				Do.
Do	Sept. 13, 1887				Do.
Do	Jan. 7, 1888		Abert's towhee, other birds.		
Do	Feb. 3, 1888				Do.
Do	Feb. 10, 1888				Do.
Payson, Ariz	Feb. 18, 1888		Red-shafted flicker.		
Morristown, N. J	May 2, 1890				Do.
Madisonville, La	Aug. 7, 1890		Pine-creeping warbler.		Grasshoppers.
Sandy Spring, Md	Sept. 19, 1890				Empty.
Do	Sept. 21, 1890				Do.
Do	do		Warbler		
Do	do		Vireo, warbler		
Do	Sept. 23, 1890		Catbird		
Do	Dec. 5, 1890				Do.
Salmon River Mountains, Idaho.	Aug. 28, 1890		Black-capped warbler.		
Portland, Conn	Oct. 1, 1890		Field sparrow		
Do	Oct. 2. 1890		Song sparrow		
Raleigh, N. C	Oct. 1884		Flicker		
Sandy Spring, Md	Dec. 9, 1890		Tree sparrow		
Dunn-Loring, Va	Dec. 10, 1890		Hermit thrush		
Wayne County, Mich	Oct. 5, 1890		Robin		
Eliot, York County, Me	Aug. 12, 1890		Warbler		
Sandy Spring, Md	Nov. 26, 1891				Do.
Portland, Conn	Oct. 10, 1891				Do.
Nashville, N. Y	May 13, 1892		Oven bird, 1 other small bird.		
Portland, Conn	May 9, 1892				Do.
Sandy Spring, Md	1892.		2 sparrows		
Do	1892.		Goldfinch and one other small bird.		
Shrewsbury, Mass	Aug. 10, 1891				Do.
Do	do		Small bird		
Do	do				Do.
Do	do				Do.

SUMMARY.—Of 159 stomachs examined, 6 contained poultry or game birds; 99, other birds; 6, mice; 5, insects; and 52 were empty.

COOPER'S HAWK.

Accipiter cooperi.

[Plate 5—Adult.]

Cooper's Hawk, which resembles the Sharp-shinned Hawk closely in everything except size, is less northern in its distribution. It inhabits the whole of North America from the southern portion of the British provinces throughout the United States and the greater part of Mexico. It winters regularly from about latitude 40° southward, though occasionally it is seen at this time of the year in southern Canada. It breeds throughout its range, and is common everywhere in suitable localities.

The food of this Hawk, like that of its smaller congener, consists almost entirely of wild birds and poultry, though from its superior size and strength it is able to cope successfully with much larger birds, and hence is much more to be dreaded. Besides birds, it occasionally captures small mammals, reptiles, batrachians, and insects. Mr. Calvin Rawson saw one of these Hawks make a bold dash at a muskrat, but it was unsuccessful in the capture. (Ornith. and Oologist, vol., VI, 1881, p. 74.) From the following quotation by Mr. Charles F. Morrison, it would appear that in Colorado it feeds more extensively on insects than in most parts of the country: "It preys upon grouse, hares, and reptiles. Its fondness for the ranchman's poultry is very nearly paid for by the insects it eats; both this and the preceding adding grasshoppers and bugs to their bill of fare." (Ornith. and Oologist, vol. XIV, 1889, p. 7.)

Mr. W. E. Clyde Todd, of Beaver, Pa., furnishes the following note on this Hawk: "The crops and stomachs of five young, still in the down, which were taken from a nest in the top of a tulip tree on July 8, 1891, contained among other things not identified, the remains of a brown thrasher and light-colored flesh, evidently that of a young ruffed grouse, of which there was a covey in the same woods."

Cooper's Hawk is very destructive to domesticated pigeons, and when it finds a cote which is easy of approach, is very troublesome. Dr. William C. Avery, of Greensboro, Ala., informs us that during one year he killed and wounded at least a dozen of these Hawks before the inroads among his doves ceased. Among the smaller birds, this Hawk is very fond of meadowlarks, robins, and flickers. The writer on several occasions has secured specimens in hot pursuit of the last named bird, which gave expression to their alarm by loud and continued cries. Poultry of all kinds form a very large part of its food. Dr. Warren states that a pair of these Hawks destroyed some fifty chickens from one farm, twelve of which were taken in a single day. The writer knew

of one of these Hawks which made daily visits to a coop containing a late brood of Wyandotte chickens, and undoubtedly would have taken all but for its timely death by the gun. The following quotations show how extensively it feeds on game and domesticated birds. Nuttall says:

"His food appears principally to be birds of various kinds; from the sparrow to the Ruffed Grouse, all contribute to his rapacious appetite. * * * His depredations among the domestic fowls are very destructive." (Land Birds, 1832, p. 90.)

Dr. Coues says: "It attacks and destroys hares, grouse, teal, and even the young of larger ducks, * * * besides capturing the usual variety of smaller birds and quadrupeds. It occasionally seizes upon reptiles or picks up insects." (Birds of Northwest, p. 338.)

Mr. H. Nehrling says: "This very common and impudent robber is the most destructive of the Raptores to the barnyard fowls; in a short time all the young chickens, turkeys, and ducks are killed by it." (Bull. Nutt. Ornith. Club, vol. VII, 1882, p. 174.)

Mr. Thomas McIlwraith says: "This is one of the chicken hawks, and it well deserves the name, from the havoc it makes among the poultry." (Birds of Ontario, p. 137.)

Mr. Henshaw informs me that the Cooper's Hawk is very partial to quail's flesh in California and the southern territories, and that it undoubtedly secures many victims. He once saw a young female dart into a bevy of Gambel's quail and seize one with the utmost ease, though the birds were flying at full speed. In an instant the flock scattered in every direction and sought refuge in the bushes, from which it proved next to impossible to dislodge them. They had recognized their enemy and evidently knew that their only chance for safety lay in close hiding.

The following examination, made by Dr. B. H. Warren, gives a very good summary of this Hawk's food: "Of the thirty-four birds which I have examined, sixteen showed the food taken to have been chickens; ten revealed small birds—sparrows, warblers, and meadow-larks; two, quail; one, bull-frogs; three, mice and insects; two, hair and other remains of small quadrupeds." (Birds of Pennsylvania, 1888, p. 80.)

This species is preëminently a 'Chicken Hawk,' as may be seen from the foregoing citations. Its devastations in this direction are much greater than those of all the other hawks and owls together, with the possible exception of the Sharp-shinned Hawk, which attacks much smaller chickens.

Like the Sharp-shinned Hawk this species has learned that the English sparrow is not only an acceptable article of food but is also a readily accessible one. Consequently of late years it has been much more common during the winter months in the larger parks of cities, where it spreads terror among the sparrows.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.

Tamias quadrivittatus.
Tamias striatus.
Sigmodon hispidus.
Spermophilus beecheyi.
Lepus sylvaticus.

BIRDS.

Bonasa umbellus.
Colinus virginianus.
Callipepla gambeli.
Zenaidura macroura.
Colaptes auratus.
Sturnella magna neglecta.
Quiscalus quiscula.
Spinus tristis.
Ammodramus s. savanna.
Zonotrichia l. intermedia.
Spizella monticola.
Spizella pusilla.
Junco hyemalis.
Melospiza fasciata.
Passer domesticus.
Pipilo erythrophthalmus.
Helminthophila celata lutescens.
Sitta c. aculeata.
Turdus u. swainsoni.
Turdus a. pallasii.
Merula migratoria.

An instance of this Hawk attacking a person was experienced by Mr. C. D. Walcott, in Lewis County, N. Y., August 31, 1886. Mr. Walcott was in a secluded glen busily engaged in collecting fossils, when an individual alighted near by. Almost instantly the bird pitched at him and was repelled with a geological hammer. Undaunted it made a second and more vigorous attack on the paleontologist, which was met in turn by more decided action on his part, and resulted in the death of the Hawk from a sweeping blow of the hammer.

The nest is situated indifferently in the tops of the lofty trees or in the second growth within 10 or 15 feet of the ground; most authors state that evergreen trees are principally chosen for the site, though the writer does not remember of ever having found one in this situation. The nest resembles that of the crow somewhat in structure and size, but lacks the finish and compact lining found in that of the latter bird. It is often bulky, the sticks composing it are quite large, and the lining usually is nothing more than the rough outer bark of the spruce, oak, or hickory. Like the preceding species, it frequently remodels the old nests of other Hawks, crows, or even those of the squirrels. The male assists in building the new nest or repairing the old one. When the nest is approached or even when the grove containing it is entered, the Hawks will often fly about and scold at the intruder until he leaves. The eggs, which are usually four or five in number, are deposited during the latter part of April to the middle of May, according to latitude. Even in Texas fresh eggs are found about the first of May, though as an exceptional case Mr. Nehrling found young in April.

The flight of this species is very rapid, irregular, and usually is carried on at no great height from the ground, in all these particulars closely resembling that of the Sharp-shinned Hawk. In the 'Birds of the Northwest' Dr. Coues mentions three birds of this species which he saw at a ranch in Arizona. They were perfectly tame, and at the time of his visit were allowed full liberty to go where they pleased, and always returned to their owner at the sound of his whistle.

DESCRIPTION.

Tail more than two-thirds as long as wing, its tip decidedly rounded; wing more than 8.80 inches (223^{mm}) and less than 12 inches (305^{mm}).

Adult.—Uniform bluish-gray above, top of head blackish; tail crossed by several blackish bands; below white, with breast and sides barred with dusky or rufous.

Immature.—Dusky above, more or less spotted with lighter, feathers with rusty edges; below whitish, streaked with brown or dusky.

Length: 14 to 20 inches (355 to 508^{mm}); extent, 27 to 32 inches (686 to 812^{mm}); wing, 8.85 to 11 inches (223 to 280^{mm}); tail, 7.80 to 10.50 inches (197 to 267^{mm}).

This species closely resembles the Sharp-shinned Hawk, but may be distinguished by its larger size and the fact that the end of the tail is rounded instead of straight or slightly notched.

Table showing the results of examinations of 133 stomachs of Cooper's Hawk (Accipiter cooperi).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Taunton, Mass	Sept. 21, 1885		Chewink		
Do	Oct. 6, 1885		do		
River Vale, N. J	Sept. 18, 1886				1 grasshopper.
Washington, D. C	Nov. 28, 1886		Tree sparrow		
Sing Sing, N. Y	Sept. 7, 1880	Chicken			
Do	Nov. 18, 1884	do			
Greensboro, Ala	Oct. 28, 1887				Empty.
Do	Mar. 6, 1887	Pigeon			
Do	July —, 1887	do			
Do	Aug. 4, 1887	do			
Do	Aug. 30, 1887				Do.
Do	Sept. 13, 1887	Pigeon			Sand lizar
Do	Sept. 27, 1887				Empty.
Wethersfield, Conn	Sept. 9, 1887				Do.
East Hartford, Conn	July 31, 1887				Do.
Sandy Spring, Md	Jan. 14, 1887	Quail			
Do	Mar. 1, 1887		Song sparrow		
Do	Apr. 22, 1887	Chicken			
Do	May 7, 1887	do			
Do	May 25, 1887				Do.
Do	Sept. 14, 1887				Do.
Do	Sept. 21, 1887				Do.
Do	Nov. 24, 1887		Purple grackle		
Do	Dec. 26, 1887	Quail			
Do	Jan. 30, 1888	do			
Do	Feb. 11, 1888		Junco, savanna sparrow.		
Chester County, Pa	Nov. 13, 1886		Junco		
Do	Nov. 27, 1886		Small bird		
Do	Dec. 17, 1886	Chicken			
Do	Jan. 10, 1887		Small bird		
Do	Jan. 17, 1887				Do.
Do	Feb. 1, 1887		Small bird		
Do	Feb. 20, 1887	Chicken			
Do	Mar. 3, 1887		Meadow lark		
Do	Dec. 6, 1878		Small bird		
New Castle Co., Del	Nov. 1, 1878	Poultry			
Williston, Pa	Dec. 6, 1878		Small bird		
East Bradford, Pa	May 25, 1875				Frog.
East Goshen, Pa	May 20, 1877			Mice	Beetles.
West Chester, Pa	Aug. 25, 1876		English sparrow		
Pocopson, Pa	Nov. 12, 1879	Poultry			
West Chester, Pa	Sept. 10, 1880		English sparrow		
Sandy Spring, Md	Mar. 17, 1888		Sparrow		
Gainesville, Fla	Dec. 22, 1887				Empty.
Sandy Spring, Md	Mar. 24, 1888		Song sparrow		
Do	Apr. 2, 1888				Do.
Do	Apr. 26, 1888	2 young chickens	1 flicker		
East Hartford, Conn	Sept. 19, 1887				Do.

Table showing the results of examinations of 133 stomachs of Cooper's Hawk (Accipiter cooperi)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md	June 28, 1888		1 flicker		
Do	do		do		
Do	do				Empty.
Custer, S. Dak	July 9, 1888		Nuthatch		
Bridgeport, Conn	Oct. 8, 1888		Bird		
Greensboro, Ala	Aug. 16, 1888				Do.
Sandy Spring, Md	Dec. 4, 1888				Do.
Do	Feb. 28, 1889			Mouse	
San Francisco Mountain, Ariz.	Aug. 4, 1889			Rocky Mountain chipmunk.	
Greensboro, Ala	Sept. 30, 1889				Do.
Sandy Spring, Md	Oct. 14, 1889			Chipmunk	
Do	Dec. 1, 1889		Feathers		
Do	Dec. 5, 1889		Gold finch		
Do	Dec. 10, 1889				Do.
Do	Dec. 12, 1889		English sparrow		
Kalamazoo, Mich	May 6, 1888	Small chicken.			
Do	Sept. 12, 1886	Chicken.			
Good Ground, Long Island, N. Y.	Jan. 13, 1882	Pigeon			
Cincinnati, Ohio	May 11, 1885		Young bird		
Do	May 24, 1885		Hermit thrush		
Brookville, Ind	Jan. 2, 1885		Feathers	Rabbit	
Do	Oct. 7, 1887			Mouse	
Fairfield, Ind	Feb. 15, 1887		Feathers		
Brookville, Ind	Nov. 24, 1888				Do.
Raleigh, N. C	Dec. 7, 1886				Do.
Do	Jan. 24, 1887		1 sparrow		
Do	May 4, 1887		1 field sparrow		
Do	Aug. 16, 1887				1 six-lined lizard.
Do	Oct. 1, 1887				Empty.
Do	Feb. 12, 1888				Do.
Do	Mar. 28, 1888	Chicken.	Dove		
Do	Sept. 20, 1888		Feathers		
Albany County, N. Y.	Aug. 14, 1878		Small bird		
Do	Sept. 15, 1884		Sparrow		
Do	Jan. 30, 1887				Do.
Rensselaer County, N. Y	Nov. 20, 1879				Do.
Do	Nov. 8, 1887			Red squirrel	
Do	Sept. 6, 1888		Robin	Chipmunk	
Do	Sept. 14, 1888	Chicken.	Small bird		
Stratford, Conn	Oct. 23, 1889		Song sparrow		
Sandy Spring, Md	Dec. 27, 1886				Do.
Do	Feb. 20, 1890		Snowbird		
Greensboro, Ala	Feb. 12, 1890	Quail			
Sandy Spring, Md	Mar. 8, 1890				Do.
Greensboro, Ala	Mar. 7, 1890		Small bird	Cotton rat	
Bellefontaine, Ohio	June 1, 1889	Young chicken			
Marfa, Tex	Jan. 22, 1890		Feathers		
Highland Falls, N. Y	May 10, 1876	Ruffed grouse.			
Camp Verde, Ariz	May 2, 1884				Do.
Do	Aug. 20, 1884	Poultry			
Do	Sept. 15, 1884	Gambels quail.			
Do	Sept. 16, 1884				Do.
Do	Sept. 23, 1884				Do.
Pine Creek, Tonto Basin, Ariz.	Oct. 24, 1884				Do.
Yavapai County, Ariz.	June 25, 1885	Gambels quail.			
Verde River, Ariz	Aug. 6, 1885				Do.
Camp Verde, Ariz	Sept. 9, 1885	Gambels quail.			
Do	May 27, 1886				Do.
Do	Aug. 15, 1886				Do.
Do	Sept. 6, 1886				Do.
Yavapai County, Ariz.	Apr. 1, 1887		Intermediate sparrow.		
Camp Verde, Ariz	May 13, 1887				Lizards.
Do	Aug. 17, 1887		Mourning dove		
Do	Nov. 1, 1887				Empty.
Do	Feb. 10, 1888				Do.
Touchet Station, Wash.	Sept. —, 1890		Orange-crowned warbler.		
Sandy Spring, Md	Nov. 19, 1890	Poultry			
Morristown, N. J	Sept. 17, 1890		Song sparrow		

AMERICAN GOSHAWK

Accipiter atricapillus HAWK

HAWK

Table showing the results of examinations of 133 stomachs of Cooper's Hawk (Accipiter cooperi)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Morristown, N. J	Sept. 19, 1890		Song sparrow		
Eubank, Ky	Apr. 15, 1889		White feathers	Gray squirrel	
Union County, Ky	Oct. 11, 1890		Thrush		
Do	Nov. 1, 1890	Chicken			
Wayne County, Mich	May 4, 1890		Meadowlark		
Lancaster County, Pa	Nov. 16, 1891				Empty.
Sandy Spring, Md	Mar. 17, 1892		Song sparrow		
Portland, Conn	Mar. 17, 1891				Do.
Do	Oct. 1, 1891		Small bird		
Do	Oct. 12, 1891	Chicken			
Do	May 1, 1892				Do.
Sandy Spring, Md	Jan. 11, 1891				Do.
Do	——do——	Quail, chicken			
Do	——, 1892	Chicken			
Three Rivers, Cal	July 28, 1891			California ground squirrel	
Clinton, Me	May 30, 1892		Song sparrow		

SUMMARY.—Of 133 stomachs examined, 34 contained poultry or game birds; 52, other birds; 11, mammals; 1, frog; 3, lizards; 2, insects; and 39 were empty.

GOSHAWK.

Accipiter atricapillus.

[Plate 6—Adult.]

The Goshawk is more northerly in its distribution than the two preceding species of the genus and is separable into two geographical races. The typical form (*atricapillus*) inhabits northern and eastern North America west to the Rocky Mountains and eastern Washington and Oregon; breeding in the east chiefly north of the United States and in the Rocky Mountains as far south as Colorado. The west coast race (*striatulus*) inhabits the Pacific coast north to Sitka, and breeds as far south, in the Sierra Nevada, as latitude 30°. The writer has seen a specimen from Labrador which to all appearances was identical with those from the west coast. In autumn and winter it wanders south casually to Virginia, Kentucky, Missouri, Kansas, and New Mexico. As above stated, but a small proportion of the species remain in the United States to breed, though a few are found in all the northern tier of States during that period. It is a common resident throughout the wooded portions of the British provinces, and in summer occurs commonly from Hudson Bay to the Arctic Circle and through the intervening country to northern Alaska.

The Goshawk, like the two preceding species of the genus, feeds largely on the flesh of birds, and to a less extent on mammals. Poultry, ducks, grouse, and many of the smaller birds, together with hares, squirrels, and other rodents make up its fare. Fortunately, in most farming districts, at least in the United States, it is comparatively rare except during the fall and winter months, otherwise its depredations among the

poultry would be a very serious matter. Its large size and greater strength enable it to carry off heavier quarry than Cooper's Hawk, and consequently its powers for mischief are more to be dreaded by the poultrymen. Mr. L. M. Turner states that in Alaska the lemming forms a consideral part of its food.

This species is one of the most daring of all the Hawks, and while in pursuit of its prey is apparently less concerned by the presence of man than any other. It will dart down unexpectedly at the very feet of the farmer and carry off a fowl. The following from the pen of the late Dr. William Wood gives evidence of its boldness:

"The goshawk is the most daring and venturesome of any of our diurnal birds of prey. A farmer who resides a few miles from my office, wishing to perpetuate the old New England custom of having a chicken pie for Thanksgiving dinner, caught some fowls, took them to a log, severed the neck of one, and threw it down beside him. In an instant a goshawk seized the struggling fowl, and, flying off some ten rods, alighted and commenced devouring his prey. The boldness of the attack so astonished the farmer that he looked on with blank amazement. Recovering from his surprise, he hastened into the house and brought out his gun, which secured him both the hawk and the fowl. Another instance of still greater daring occurred near East Windsor Hill, Connectcut. A goshawk flew after a fowl near a dwelling house; the door being open, the hen flew inside; the hawk followed, and seized her in the room occupied by an old gentleman and his daughter. The old man hastened to the rescue, and struck the hawk with a cane before it released its grasp. The daughter caught the hawk as it attempted to fly out of the door, and killed it." (Amer. Nat., vol. x, 1876, p. 134).

Capt. Charles E. Bendire informed the writer that at Fort Klamath, Oregon, he once shot at a Goshawk and slightly wounded it with fine shot, and in the course of a few minutes it returned and attacked a chicken. Numerous cases are on record where it has flown through windows to attack canaries or other cage birds.

In the general character of its flight, as well as the mode of hunting and capturing its prey, it closely resembles Cooper's Hawk, though it frequents the thick woods rather more than the latter bird. In the fall this Hawk is common along the smaller water courses where it is very destructive to wild ducks and other water fowl, and is able to strike down a bird as large as a full-grown mallard. If its prey is a bird of this size it rarely eats more than the flesh from the breast, leaving the rest of the carcass untouched. Scorning to feed upon carrion, another victim is secured when hunger returns.

Of the upland game birds the ptarmigan in the North and the ruffed grouse in the middle districts suffer severely from the attacks of this powerful Hawk. Dr. William H. Dall, who found it common in the valley of the Yukon River, states that it feeds largely on the white ptarmigan, the flocks of which it follows from place to place. E. W. Nelson and

L. M. Turner both corroborate its destructiveness among these birds. In some parts of the country the Goshawk hunts the ruffed grouse so persistently that it is known by the name of 'Partridge Hawk,' and this bird probably has no worse enemy except man. As Audubon was passing down the Ohio he observed one of these Hawks dive into a flock of grackles which was crossing the river, and kill four or five of them. After giving each victim a fatal squeeze the Hawk allowed it to fall to the water and at the close of the chase returned and picked up all from the surface.

Its rapid flight and the rapidity with which it makes a sudden turn enable it to capture squirrels without trouble, rabbits and mice being also taken.

A very curious performance which was enacted by this bird, with a night heron as a second party, was witnessed by Mr. H. W. Henshaw, and is as follows: "One that I shot on the Williamson's River was in hot chase of a kingfisher, which he doubtless would have seized in another moment. Another, on the same river, was noticed chasing a night heron. The attack was persistently kept up, but evidently with no intention on the part of the hawk of making the heron his prey. Forcing the heavy-winged heron into the open this hawk would close in and apparently give the ungainly bird a buffet with his wing, which each time produced a loud and discontented squawk. It occurred to me, as a possible solution of the motive of the hawk, that he intended to force his victim to throw up any fish it might have secured, and so furnish him an easy dinner." (Report of the Chief of Engineers, U. S. A., 1879, p. 2292.)

Little can be said in favor of this Hawk, as the destruction of a few injurious rodents is a very meager offset for the great number of game birds and the poultry it destroys.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.	BIRDS.
Lepus sylvaticus.	*Bonasa umbellus.*
Sciurus richardsoni.	*Colinus virginianus.*
Sciurus hudsonicus.	*Zenaidura macroura.*
Sciurus carolinensis leucotis.	

The nest is a bulky structure, and, although considerably larger, resembles quite closely in appearance that of the crow, except that it lacks the compact and nicely arranged lining common to the nest of the latter species. Externally it is composed of tolerably large sticks loosely placed together, which surround a more compact mass of smaller twigs containing the cavity of the nest. The lining is usually nothing more than a small quantity of soft inner bark, weed stalks, or leaves. The nest is situated in a large tree, generally an evergreen, well up among the higher branches, and in the thickest part of the forest.

The eggs, which are from two to five in number, three being the rule, are deposited from the middle of April to the latter part of May, according to the latitude.

DESCRIPTION.

Bare portion of leg in front shorter than middle toe; wing more than 12 inches (305^{mm}).

Adult.—Above bluish slate color with blackish shaft streaks; top of head deep black; tail crossed by four dusky bands; below white, thickly barred with narrow zigzag lines of grey; feathers often streaked in middle with dusky.

Immature.—Above, dusky greyish, feathers margined with buff; below, whitish or pale buff with narrow stripes of blackish.

Length: 21 to 25 inches (533 to 634^{mm}); extent, 42 to 46 inches (1067 to 1169^{mm}); wing, 12 to 14.25 inches (305 to 362^{mm}); tail, 9.50 to 12.75 inches (241 to 324 ^{mm}).

Table showing the results of examinations of 28 stomachs of the Goshawk (Accipiter atricapillus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md	Dec. 27, 1887			Rabbit	
Adirondack Mts., N. Y	Oct. 31, 1882	Ruffed grouse.		2 red squirrels	
Philadelphia, Pa	Jan. 12. 1886			Rabbit	
Dixon and Cedar counties, Nebr.	Aug. — 1867			do	Few locusts.
Tioga, Pa	Feb. 17, 1886			Mouse, weasel	
Elmira, N. Y	Apr. 12, 1886			Mice	Beetles.
Bridgeport, Conn	Oct. 29, 1888	Fowl			
Lockport, N. Y	Feb. 5, 1889	do			
Coram, Suffolk County, N. Y.	Feb. 2. 1889	do			
Grant County, N. Mex.	Sept. 4, 1886	do			30 sphinx larvæ, 3 centipeds.
Troy, N. Y	Nov. — 1878				Empty.
Saratoga County, N. Y.	Dec. — 1879				Do.
Rensselaer County N. Y.	Oct. 25, 1884	Ruffed grouse.		Gray squirrel	
Do	Dec. 29, 1884	do			
Do	Oct. 1885		Large bird		
Do	Oct. 20, 1886			Squirrel	
Huntington, N. Y	Dec. 22, 1889				Do.
San Francisco Mountain, Ariz.	Aug. 20 1889		Mourning dove		
Elk River, Minn	Feb. 10, 1890	Chicken.			
Catskill Mountains, N. Y.	Dec. 2. 1879				Do.
Camp Verde, Ariz	Dec. 2, 1886				Do.
Do	Jan. 10, 1887	Poultry.			
West Point, N. Y	Dec. 27, 1880				Do,
Saw Tooth Mountains, Idaho.	Sept. 30, 1890				Do.
Do	Sept. 28, 1890			Red squirrel	
Birch Creek, Idaho	Sept. 8, 1890				Do.
Salmon River Mountains, Idaho.	Sept. 6, 1890			do	
Morris Plains, N. J	Nov. 12, 1890	Quail			

SUMMARY.—Of 28 stomachs examined, 9 contained poultry or game birds; 2, other birds; 10, mammals; 3, insects; 1, centiped; and 8 were empty.

HARRIS'S HAWK.

Parabuteo unicinctus harrisi.

Harris's Hawk is a southern species, occurring in most portions of middle America and extending northward regularly to Texas and Arizona. The typical form, of which our bird is a geographical race, inhabits South America from Chile and the Argentine Republic northward to the isthmus of Panama. Audubon's type was secured in Louisiana, but the bird is rare in that State.

The food of this Hawk consists largely of offal, the smaller reptiles and mammals, and occasionally birds. Mr. C. C. Nutting states that a specimen obtained in Costa Rica was shot while in the act of carrying off a chicken. (Proc. U. S. Nat. Mus., vol. v, 1882, p. 404). The following is what Mr. G. B. Sennett says of its food in Texas: "I found in the crops of those I obtained, mice, lizards, birds, and often the Mexican striped gopher (*Spermophilus mexicanus*), proving them active hunters, instead of the sluggish birds they appeared the year before at Brownsville" (Bull. U. S. Geol. and Geog. Sur. Terr., vol. v, pp. 419–420).

This species, like other Hawks of the same class, does very little damage to poultry or beneficial birds. The nest is placed indifferently in bushes among the long leaves of the Spanish bayonet (yucca) or in trees to the height of 40 or 50 feet. The eggs, which are usually two or three in number, are deposited in the first or second week in April and the young make their appearance early in May. Both birds assist in incubating the eggs as well as in securing food for the young.

The species is not shy, and may be approached without much difficulty. This fearlessness on the part of the bird most probably accounts for the statements that it is peculiarly sluggish, whereas it is no more so than the other buzzard hawks.

DESCRIPTION.

Space between eyes and base of upper part of bill nearly naked. Inner webs of the five outside wing feathers cut out. Prevailing color uniform dark sooty brown; shoulders, under wing feathers, and thighs rich chestnut; tail black, with base and broad band at tip white; feathers covering base of tail white.

Length: 17.50 to 24 inches (445 to 610^{mm}); extent 43 to 47 inches (1092 to 1194^{mm}); wing 12.30 to 14.50 inches (312 to 368^{mm}); tail 9.80 to 11 inches (248 to 280^{mm}).

Table showing the results of examinations of 6 stomachs of Harris's Hawk (Parabuteo unicinctus harrisi).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Phœnix, Ariz	May 13, 1889			Small mammal	
Do	do			Fort Yuma spermophile.	
Do	do			Spermophile	
Do	do			Small mammal	
Do	do			Rabbit hair	Cuterebra.
Rio Verde, Ariz	May 18, 1886				Empty.

SUMMARY.—Of 6 stomachs examined, 5 contained mammals; 1, insects; and 1 was empty.

RED-TAILED HAWK.

Buteo borealis.

[Plate 7—Adult and immature.]

The Red-tail, or 'Hen Hawk,' as it is commonly termed, is one of the best known of all our raptorial birds. Its large size, wide distribution, and habit of frequenting open ground while hunting, cause it to be noticed by the most indifferent observer. The careful study of the food of this Hawk is of the greatest economic importance. The more so from the fact that like its congener the Red-shouldered Hawk, its inappropriate name 'Hen Hawk' stimulates an unceasing warfare against it. The farmers, who are chiefly benefited by it, are its most pronounced enemies, because of the erroneous belief that the Red-tailed Hawk is a persistent and destructive enemy of poultry.

A species as powerful and numerous as this must exert a marked influence for good or evil on agriculture, according as its food consists of beneficial or injurious forms of animal life.

Abundant proof is at hand to show that this Hawk greatly prefers the smaller mammals, reptiles, and batrachians, taking little else when these are obtainable in sufficient numbers; but if hard pressed by hunger it will eat almost any form of animal life, such as poultry and other birds, insects, crawfish, and even offal or carrion. Mr. Vernon Bailey, writing from Marfa, Tex., in January, 1890, says: "The crops and stomachs of seven contained hair and flesh of goats. A large number of goats are kept near here, and the hawks feed on those that die."

It is to be remarked that young Hawks are less particular as to the character of their food, and they are more frequently found to be the depredators of the poultry yards. The reason for this seems to be a lack of skill in procuring a sufficient quantity of the more usual prey. During winter a number of these immature birds frequent the extensive crow roost in the Arlington National Cemetery, near the city of Washington, and subsist partially on the dead and sickly crows. On one occasion, while on the river marsh below the roost in company with Mr. W. F. Roberts, the writer saw one of these birds stoop at a crow

RED-TAILED HAWK

Buteo borealis (Gmel)

Buteo bo.
Buteo bo.

which had just been shot. During the descent the crow made considerable commotion, which evidently attracted the Hawk, for with a swiftness of flight that would have done credit to the Duck Hawk it struck the crow just as it reached the ground. In the warmer parts of the year, the Red-tail feeds quite extensively on snakes and frogs, and individuals may be seen flying with snakes in their talons, or may be started from the marshes while watching for frogs. Audubon states that he has seen it pounce on soft-shelled tortoises, but in each case the latter appeared to be successful in escaping to the water. At certain times, like the other *Buteos*, this Hawk seems to relish a diet of insects, of which grasshoppers, crickets, and the larvæ and imagos of the larger beetles form a large proportion.

Meadow mice seem to form the staple article of its food, although at times other species of mice, arboreal and ground squirrels, rabbits, or an occasional mole or shrew are found among the stomach contents. This Hawk and its allied species render valuable service in reducing the numbers of ground squirrels (*Spermophilus* and *Tamias*) and rabbits, so abundant and excessively injurious to crops in some parts of the west. In western Texas Mr. Lloyd states that the Red-tail "feeds on prairie dogs, cotton-tails, jack-rabbits, and occasionally brings a scaled quail to the young." (Auk, vol. IV, 1887, p. 188.)

Mr. William Brewster, writing of the food of this Hawk, says: "At this season [winter] it feeds exclusively on mice and rats; in early spring on toads, frogs, snakes, and the like. I doubt if it ever attacks birds, for in about a dozen specimens examined at different seasons I have never been able to detect any of their remains, nor have I ever seen it pursue one. Occasionally a wounded quail or snipe will fall a prey, but such cases must be rare." (Forest and Stream, vol. VI, 1876, p. 3.)

Joseph H. Batty writes: "The red-tailed hawk is a powerful bird, and I once saw one strike a full-grown muskrat, which it tore to pieces and devoured the greater part. * * * I have taken portions of the bodies of young woodchucks and gray rabbits from the craws of hawks of this species; it is evident that they prey largely upon mammals as well as fowl." (Forest and Stream, IV, 1875, p. 374.)

Mr. Calvin Rawson says: "In one nest of Red-tailed Hawks I have seen portions of nine red squirrels, and from another have counted out on the ground seven entire bodies. A game bird or chicken now and then, but red squirrels for everyday bill of fare." (Ornithologist and Oologist, vol. VIII, 1883, p. 17.)

Of 173 stomachs of this Hawk examined by Dr. B. H. Warren, 131 contained the remains of mice; 6, rabbits; 3, red squirrels; 2, skunks; 18, small birds; 14, poultry; 3, insects; 3, snakes; and 4, offal or carrion. He says: "I have repeatedly found three and four mice in the viscera of one bird, oftentimes five, and in a few instances as many as seven of these destructive little rodents were obtained from the crop and stomach of one hawk." (Birds of Pennsylvania, 1888, p. 86.)

Of 562 stomachs examined by the author, 54 contained poultry or game birds; 51, other birds; 278, mice; 131, other mammals; 37, batrachians and reptiles; 47, insects; 8, crawfish; 13, offal; and 89 were empty. It has been demonstrated by careful stomach examination that poultry and game birds do not constitute more than 10 per cent of the food of this Hawk, and that all the other beneficial animals preyed upon, including snakes, will not increase this proportion to 15 per cent. Thus the balance in favor of the Hawk is at least 85 per cent, made up largely of various species of injurious rodents—a fact that every thoughtful farmer should remember. It is not to be denied that a good deal of poultry is destroyed by this Hawk, but the damage done is usually among the less vigorous fowls in the late fall, and in view of the great number of injurious rodents as well as other noxious animals which this Hawk destroys it should seem equivalent to a misdemeanor to kill one, except in the act of carrying off poultry. The fact that there are robbers among Hawks is no sound argument for exterminating any and every one.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.

Sciurus aberti.
Sciurus carolinensis.
Sciurus c. leucotis.
Sciurus arizonensis.
Sciurus hudsonicus.
Tamias striatus.
Tamias quadrivittatus.
Spermophilus lateralis.
Spermophilus grammurus.
Spermophilus franklini.
Spermophilus tridecemlineatus.
Reithrodontomys humilis.
Mus decumanus.
Mus musculus.
Sitomys americanus.
Sitomys sonoriensis.
Neotoma mexicana.
Arvicola riparius.
Arvicola pinetorum.
Synaptomys cooperi.
Sigmodon hispidus.
Zapus hudsonius.
Erethizon dorsatus.
Lepus texianus.
Lepus sylvaticus.
Lepus s. arizonæ.
Lepus s. nuttalli.
Thomomys.
Perodipus ordii.
Mephitis mephitica.
Sorex.
Blarina brevicauda.
Blarina b. carolinensis.
Blarina exilipes.
Scalops aquaticus.

BIRDS.

Dafila acuta.
Rallus elegans.
Colinus virginianus.
Callipepla gambeli.
Bonasa umbellus.
Zenaidura macroura.
Megascops asio.
Melanerpes erythrocephalus.
Otocoris alpestris.
Corvus americanus.
Sturnella magna.
Icterus spurius.
Quiscalus quiscula.
Poocætus gramineus.
Ammodramus s. passerinus.
Spizella monticola.
Junco hyemalis.
Melospiza fasciata.
Merula migratoria.
Sialia sialis.

Like many other Hawks, the Red-tail seems to delight in circling high among the clouds, where it is barely visible from the ground or even

may pass from sight in the clear space above. While thus soaring, as at other times, it utters its penetrating but not unpleasant note. On account of its usually sluggish flight it is unfitted to capture active prey, in most cases descending on it from a perch and rarely darting after it while on the wing, as is the habit of the Falcons and members of the Goshawk group. When other individuals are near, or in captivity when persons are present, it has the habit of covering its food from sight by spreading its tail and dropping the wings, and while feeding it reaches well back under the canopy thus formed, making it difficult to determine the character of the quarry.

In the East, continued persecution has made the Red-tail wary and very difficult to approach except on horseback. In parts of the West, however, where these birds are unmolested, their disposition is quite different, and they are comparatively tame. Mr. H. W. Henshaw, speaking of them at Mount Graham, Arizona, in October, says:

"Walking quietly along, there was no difficulty in approaching within a few yards of the tree where one chanced to perch. One individual which I scared from its perch by throwing a stone took a few broad circles about me, as though wondering what it meant, and then quietly returned to his former stand." (Explor. West of the 100th Merid., Wheeler, vol. v, 1875, p. 424.)

Like other birds of prey, the Red-tail, when taken young, soon becomes reconciled to captivity and makes a gentle and interesting pet. Its fondness for water is shown by the avidity with which it both bathes and drinks in the cage, as well as when free.

During migrations this Hawk often travels in large flocks and generally at a great elevation. Immense numbers pass over certain sections, which seems to be in the line of its flight. In the Hudson River valley, late in September a number of years ago, the writer observed a flock containing sixty-five individuals flying in a comparatively compact body, probably not more than a few feet from each other.

Mr. William Perham, of Tyngsboro, Mass., captured about 300 of these birds during two weeks in April, 1878 (Maynard, Birds of Eastern North America, p. 310). In winter a few hardy individuals may occasionally be found north of latitude 42°, but the great majority pass south and spread over the country even into Florida. In suitable localities, where extensive meadows and stubble fields harbor myriads of mice, these Hawks congregate in considerable numbers, as shown by the fact that about 175 specimens have been sent to the Department of Agriculture by Messrs. Miller and Leizear from a single locality in Montgomery County, Md., during the past few winters.

The increase of any animal is always followed by a relative increase of its natural enemies. This is clearly shown on the river front in the vicinity of Washington, D. C., where the recent improvements have redeemed several hundred acres of ground from the tidal flats; and already in many places rank vegetation has grown up, affording shelter and sus-

tenance for hordes of mice. At present in winter and early spring it is not uncommon to see ten or fifteen Red-tailed Hawks in different parts of this flat attracted hither by the abundance of their natural food. Prior to the reclamation of the flats not more than a pair or two were to be seen in the same neighborhood during the winter.

The Red-tailed Hawk proper inhabits eastern North America west to the Great Plains, north at least to latitude 60°, and south to eastern Mexico, and probably breeds throughout most of this range, though more commonly north of the parallel of 40°. In the West it is separated into the three following geographical races, so that as a species its range covers the whole United States:

The Western Red-tailed Hawk (*Buteo borealis calurus*) inhabits the country west of the Rocky Mountains, as well as portions of Mexico.

Krider's Red-tailed Hawk (*Buteo borealis kriderii*) is found in the Great Plains from Minnesota to Texas, and extends east casually to Illinois.

Harlan's Red-tailed Hawk (*Buteo borealis harlani*), which until recently was considered a good species, dwells in the lower Mississippi Valley and Gulf States, east to Georgia, and extends casually to Iowa, Illinois, and Pennsylvania.

Two other races occur in North America south of the Mexican frontier, one (*Buteo borealis lucasanus*) on the peninsula of Lower California, and the other (*Buteo borealis costaricensis*) in Central America.

DESCRIPTION.

Adult.—Upper surface of tail deep rusty rufous with usually a black subterminal band; above blackish brown, variegated with gray fulvous and whitish; below white with more or less buffy, belly streaked with dusky or brown.

Immature.—Tail bright gray without any shade of red, and crossed by six to ten regular dark bands. A pronounced blackish zone across the upper part of the belly.

In Harlan's Hawk the tail is mottled with rusty, white, gray, and dusky; the rest of the plumage may vary from that of the typical red tail to nearly black.

The Western Red-tail varies from a light extreme much like the typical Red-tail to a uniform dark, sooty brown; and the tail usually has more than one dark band.

Krider's Hawk is light-colored with much white on upper parts and entirely white or pale buff on lower parts.

Length: 19 to 25 inches (482 to 635^{mm}); extent, 49 to 58 inches (1245 to 1475^{mm}); wing, 13.50 to 17.75 inches (342 to 451^{mm}); tail, 8.50 to 10.50 inches (216 to 267^{mm}).

Table showing the results of examinations of 562 stomachs of the Red-tailed Hawk (Buteo borealis).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Taunton, Mass	Nov. 18, 1885		Feathers		
Portland, Conn	Sept. 4, 1885				2 adders, ribbon snake, toad.
Do	Nov. 25, 1885	Fowl			
Alfred Center, N. Y	Aug. 28, 1886				Grasshoppers.
Do	Oct. 25, 1886			Shrew	
Peterboro, N. Y	July 5, 1886	Fowl			
Oneida Lake, N. Y	Aug. 30, 1886			Red squirrel	
Morrisville, N. Y	Sept. 27, 1886			Meadow mouse	
Chester County, Pa	May 15, 1886	Fowl	Oriole	Rabbit	Grubs.
Do	Mar. 10, 1886			Meadow mouse	
Birmingham, Pa	Mar. 15, 1886	Fowl	Grackle		
Portland, Conn	July 25, 1886				Empty.
Chickamauga, Tenn	Feb. 13, 1886				Offal.
Lockport, N. Y	July 13, 1886			4 meadow mice	Toad, 2 beetles.
Forge, Suffolk County, N. Y.	Feb. 16, 1887	Fowl			
Whitewater, Wis	Aug. 17, 1887			Meadow mouse	13 grasshoppers, 5 crickets, 1 beetle, 1 crawfish.
Washington, D. C	May 4, 1887			Pine mouse, meadow mouse.	Large adder.
Middletown, Conn	Nov. 20, 1886			Mouse	5 grasshoppers.
Portland, Conn	Dec. 29, 1886			Gray squirrel	
Gainesville, Va	Jan. 2, 1888			2 house mice	
Howard County, Md	Nov. 3, 1887				Empty.
Washington, D. C	Dec. 29, 1887		Song sparrow	Meadow mouse	
Do	Jan. 20, 1888			House mouse, 3 meadow mice.	
Sing Sing, N. Y	Feb. 18, 1885			4 meadow mice, 2 white-footed mice, shrew.	
Do	Apr. 13, 1885			2 shrews	
Lewis County, N. Y	Aug. 3, 1876				Garter snake.
Portland, Conn	Mar. 2, 1887				Empty.
Troy, Pa			Screech owl		
Devils Lake, N. Dak	Aug. 11, 1887			Gray gopher, striped gopher.	Frogs, 10 large grasshoppers.
East Hartford, Conn	Sept. 14, 1885				2 frogs, potato beetle.
Sandy Spring, Md	Jan. 8, 1887			Pine mouse, shrew.	
Do	....do			2 meadow mice	
Do	....do			Meadow mouse, white-footed mouse, shrew.	
Do	....do			4 house mice, 1 meadow mouse.	
Do	....do			3 house mice, 1 meadow mouse, shrew.	
Do	....do			3 meadow mice	
Do	....do			3 meadow mice, 3 shrews.	
Do	....do			1 house mouse, 2 pine mice, 2 meadow mice, 1 shrew.	
Do	Jan. 14, 1887				Empty.
Do	....do			1 pine mouse, 2 meadow mice.	
Do	Jan. 22, 1887			Meadow mouse	
Do	....do			....do	
Do	....do			....do	
Do	Jan. 28, 1887			....do	
Do	....do		Crow	....do	
Do	....do		....do		
Do	Feb. 11, 1887				Do.
Do	....do			Meadow mouse	Larva.
Do	....do			Pine mouse, meadow mouse.	
Do	Mar. 2, 1887			Shrew	
Do	....do				Do.
Do	....do			Meadow mouse, 2 house mice.	
Do	....do			1 meadow mouse, 1 house mouse.	

Table showing the results of examinations of 562 stomachs of the Red-tailed Hawk (Buteo borealis)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md	Mar. 2, 1887			2 meadow mice, gray squirrel.	
Do	do			Meadow mouse	
Do	do			Shrew	
Do	do				Empty.
Do	do	Fowl			
Do	do			5 meadow mice	
Do	do		Bluebird	Meadow mouse	
Do	do		Tree sparrow		Grasshopper.
Do	do			Meadow mouse	
Do	do			do	
Do	Mar. 5, 1887		2 song sparrows	do	
Do	do			Meadow mouse, white-footed mouse, mole.	
Do	do		Song sparrow	Rabbit	
Do	do		Feathers		
Do	do				Empty.
Do	do			2 meadow mice, rabbit.	
Do	Mar. 8–10, '87			Meadow mouse	2 wood frogs.
Do	do			do	
Do	do				Empty.
Do	do			3 meadow mice	
Do	do			2 moles	
Do	do			Shrew	
Do	do			Rabbit	
Do	do			do	
Do	do			Gray squirrel	
Do	do			Meadow mouse, chipmunk.	Crawfish.
Do	Mar. 12, 1887		Feathers		
Do	Mar. 18, 1887		Robin	Meadow mouse	
Do	Mar. 24, 1887			3 meadow mice	
Do	Apr. 1, 1887		2 sparrows	Meadow mice	
Do	do			Pine mouse	
Do	Apr. 25, 1887			Mole	Insect remains.
Do	Apr. 28, 1887			Meadow mouse, gray squirrel.	
Do	Nov. 14, 1887				Empty.
Do	do				Do.
Do	do				Do.
Do	Nov. 27, 1887			Gray squirrel	
Do	Dec. 12, 1887				Do.
Do	do			House mouse	
Do	Dec. 24, 1887			2 meadow mice	
Do	Dec. 26, 1887				Do.
Do	do			1 house mouse, 1 meadow mouse, 3 shrews.	
Do	do			Meadow mouse	
Do	do				Do.
Do	Jan. 3, 1888			2 meadow mice	
Do	Jan. 7, 1888			Meadow mouse	
Do	Jan. 14, 1888		Meadowlark	3 meadow mice	
Do	Jan. 11, 1888			2 house mice	
Do	Jan. 14, 1888	Fowl			
Do	Jan. 19, 1888			5 meadow mice	
Do	Jan. 30, 1888		Crow		
Do	Jan. 28, 1888			Meadow mouse	
Do	Jan. 30, 1888		Crow	House mouse	
Do	Feb. 13, 1888				Do.
Do	Feb. 18, 1888				Do.
Do	Feb. 22, 1888				Do.
Chester County, Pa	May, 1886	Fowl	Oriole	Gray squirrel	
Do	Oct. 15, 1886			House mouse	
Do	Nov. 22, 1886			Meadow mouse	
Do	Nov. 16, 1886	Fowl		do	
Do	Dec. 4, 1886				Do.
Do	Dec. 8, 1886				Offal.
Do	Dec. 29, 1886			4 meadow mice	
Do	Feb. 11, 1887				Empty.
Do	Feb. 16, 1887				Do.
Do	Dec. 11, 1886		Sparrow		
Do	Jan., 1887	Fowl		Meadow mouse	
Do	Dec. 11, 1886				Do.
Do	Dec., 1886			House mouse, meadow mouse.	
Do	do		Song sparrow	2 meadow mice	

Table showing the results of examinations of 562 stomachs of the Red-tailed Hawk (Buteo borealis)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester County, Pa.	Nov., 1886		Song sparrow	Pine mouse	
Do	do			do	
Do	Feb. 16, 1887	Fowl			
Do	Dec., 1886	do		Meadow mouse, 2 house mice.	
Do	Dec. 11, 1886			7 house mice	
Do	Dec. 18, 1886				Empty.
Do	Apr. 20, 1886			Mouse	Beetles.
Do	Dec. 28, 1886			4 meadow mice	
Do	Nov., 1886				Empty.
Do	do			Meadow mouse	
Do	do			2 meadow mice	
Do	do			3 meadow mice	
Do	do			2 meadow mice	
Do	Dec. 28, 1886			1 meadow mouse	
Do	do			Meadow mice, rabbit.	
Do	do			5 meadow mice	
Do	Jan. 15, 1887	Fowl			
Do	Nov., 1886			2 house mice, 1 meadow mouse.	
Do	do			3 meadow mice	
Do	Jan., 1887			2 meadow mice, mole.	
Do	do			Meadow mouse, rabbit, shrew.	
Do	do			Meadow mouse, red squirrel.	
Do	do			3 meadow mice	
Do	Oct., 1886			3 meadow mice, red squirrel.	
Do	Dec., 1886			4 meadow mice	
Do	do			1 meadow mouse	
Do	Jan., 1887		Feathers	do	
Do	do			Rabbit	
Do	do		Feathers		
Do	Dec., 1886			3 meadow mice	
Do	Oct., 1886			Red squirrel	
Do	Dec., 1886	Fowl		House mouse	Grasshopper.
Do	do	do			
Do	Jan. 25, 1887			House mouse	
Do	do			Meadow mouse, white-footed mouse.	
Do	Jan. 26, 1887			Meadow mouse	
Do	do			6 meadow mice	
Do	Dec. 31, 1886			Mouse	
Do	Jan. 1, 1887			White-footed mouse, shrew.	
Do	Jan. 3, 1887			Meadow mouse	
Do	Jan. 7, 1887			Mouse	
Do	Jan., 1887			Meadow mouse	
Do	do			2 meadow mice	Frog.
Do	do			2 meadow mice, shrew.	
Do	do			1 meadow mouse	
Do	do			Meadow mouse	
Do	do			do	
Do	do			do	
Do	Jan. 18, 1887		Meadowlark		
Do	Jan. 17, 1887			House mouse	
Do	Jan. 22, 1887			5 meadow mice	
Do	Nov., 1886			Mouse	
Do	Dec., 1886			Red squirrel	
Do	Nov., 1886			Meadow mouse; red squirrel.	
Do	do			Meadow mouse	
Do	Jan., 1887		Tree sparrow		
Do	do				Empty.
Do	do		Crow		
Do	do			Meadow mouse	
Do	do			2 meadow mice, white-footed mouse.	
Do	Feb., 1887			Meadow mouse	
Do	do			do	
Do	do			6 meadow mice	
Do	do			Meadow mouse, shrew.	

Table showing the results of examinations of 562 stomachs of the Red-tailed Hawk (Buteo borealis)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester County, Pa	Feb., 1887			3 meadow mice, 2 house mice.	
Do	do				Offal.
Do	Mar. 10, 1887			Shrew	
Do	do			Meadow mouse	
Do	do			2 meadow mice	
Do	Feb., 1887			7 meadow mice	
East Bradford, Pa	Feb. 4, 1879			Mice	
Westtown, Pa	Jan. 5, 1881				Grasshoppers.
East Bradford, Pa	Feb. 15, 1879			Mice	
Do	do			do	
Do	do			do	
Williamstown, Pa	Apr. 4, 1878			do	
Westtown, Pa	Mar. 11, 1879			do	
Pocopson, Pa	Nov. 25, 1878	Quail			
Willistown, Pa	Jan. 3, 1879			Mice	
West Bradford, Pa	Jan. 13, 1879	Poultry			
Kennett, Pa	Jan. 15, 1879	do			
Do	do			Mice	
Willistown, Pa	Jan. 21, 1879			do	
Do	do			do	Insects.
East Bradford	Mar. 24, 1879			do	Do.
Do	Dec. 25, 1884			do	
Chester County, Pa	Feb. 15, 1878			do	
Birmingham, Pa	Dec. 31, 1884	Poultry			
Willistown, Pa	Jan. 6, 1885			Mice	
Do	do			do	
East Bradford, Pa	do			do	
Chester County, Pa	Jan. 5, 1881				Grasshoppers.
Willistown, Pa	Feb. 15, 1878			Mice	
Do	Oct., 1876		Small bird	Rabbit	
East Bradford, Pa	Aug. 15, 1876		do		
Willistown, Pa	Apr. 8, 1877	Poultry		Mice	
Do	do	do			
Lancaster County, Pa	Apr. 2, 1878			Mice	
West Bradford, Pa	Nov. 25, 1879	Quail			
East Bradford, Pa	Feb. 4, 1879			Mice	
Caln, Pa	Feb. 22, 1879			do	
Do	do			do	
Westtown, Pa	Jan. 23, 1879			do	
Do	do			do	
East Bradford, Pa	Jan. 20, 1879			do	
Westtown, Pa	Jan. 28, 1879			do	
Do	do			do	
Do	Jan. 20, 1879			do	
Do	do			do	
East Bradford, Pa	Feb., 1879			do	
Do	do			do	
Lancaster County, Pa	Apr. 2, 1878			do	
East Bradford, Pa	Feb., 1879			do	
Westtown, Pa	Jan. 28, 1879			do	
Chester County, Pa	do				Offal.
Pocopson, Pa	Feb. 8, 1879			Mice	
Caln, Pa	Feb. 9, 1879			do	
West Goshen, Pa	Feb. 7, 1879			do	
Westtown, Pa	Jan. 29, 1879			do	
Maryland	Feb., 1879			Red squirrel, mice.	
East Bradford, Pa	Feb. 8, 1879			Mice	
Willistown, Pa	Jan. 21, 1879			do	
West Whiteland, Pa	Mar., 1879			3 mice	
Willistown, Pa	Jan. 13, 1879			Mice	
Chester County, Pa	Jan. 3, 1879	Poultry			
West Bradford, Pa	Jan. 3, 1880	do			
Willistown, Pa	Nov. 27, 1874			Red squirrel	
East Bradford, Pa	Dec., 1882			Red squirrel, mice.	
Willistown, Pa	Jan., 1882			Rabbit	
Westtown, Pa	Jan. 5, 1881			Mice	Grasshoppers and crickets.
Willistown, Pa	Jan. 2, 1880			do	Insects.
West Bradford, Pa	Nov. 27, 1880			do	
Willistown, Pa	Mar. 27, 1880		Small bird	do	
Do	Mar. 22, 1880	Quail			
East Goshen, Pa	Mar. 20, 1880			Red squirrel, mice.	
Willistown, Pa	do			Mice	
Birmingham, Pa	Feb. 26, 1880			do	
Delaware County, Pa	Feb. 23, 1880			do	

Table showing the results of examinations of 562 stomachs of the Red-tailed Hawk (Buteo borealis)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Delaware County, Pa.	Feb. 23, 1880			Mice	
Do	Jan. 30, 1880			do	
Westtown, Pa	Dec. 5, 1879			do	
Chester County, Pa	Dec. 3, 1879	Poultry.			
Do	do			Mice	
New Garden, Pa	Nov. 26, 1879			do	
East Goshen, Pa	Sept. 15			do	
Chester County, Pa.	Dec. 10, 1877	Poultry.			
Do	Oct. 3, 1880			Mice	
Willistown, Pa	Feb. 1876		Feathers		
Do	Jan. 20, 1876			Mice	
Do	Jan. 1876			do	
Do	Dec. 19, 1878			do	
Do	Jan. 18, 1875			do	
Do	Nov. 20, 1876			do	
Do	Mar. 26, 1876			do	
Chester County, Pa.	Sept. —, 1874			Gray squirrel	
West Goshen, Pa	Dec. —, 1875			Mice	
East Goshen, Pa	Feb. 19, 1876				Empty.
Dakota City, Nebr	July, 1870	Quail			37 insects.
Elmira, N. Y	June 1, 1886			Rat, red squirrel	
Do	June 19, 1886	Chicken			
Do	July 21, 1886				Grasshopper, beetles.
Do	Oct. 2, 1886			3 mice	
Wellsburg, N. Y	Apr. 7, 1887			Hair	Beetles.
Halsey Valley, N. Y	Aug. 10, 1887			2 mice	Grasshoppers.
Sandy Spring, Md	Mar. 6, 1888		Tree sparrow		
Do	do		2 tree sparrows, 1 song sparrow.	Meadow mouse	
Do	Mar. 7, 1888				Empty.
Do	do				Do.
Do	do		Song sparrow, junco.	Meadow mouse, rabbit.	
Do	Mar. 9, 1888			Mole	
Do	Mar. 15, 1888				Do.
Do	do		Song sparrow	Meadow mouse	
Do	do			2 house mice	
Do	Mar. 17, 1888			Shrew	
Do	do			Meadow mouse	
Do	Mar. 19, 1888			do	
Gainesville, Fla	Jan. 4, 1888			2 cotton rats	
Sandy Spring, Md	Mar. 24, 1888			1 pine mouse, 1 meadow mouse.	
Chester County, Pa.	Feb. —, 1887			2 meadow mice	
Do	Jan. —, 1887			do	
Do	Apr. —, 1887			3 meadow mice	
Do	Feb. —, 1887			Meadow mice	
Do	do			do	
Do	do			do	
Do	do			do	
Sandy Spring, Md	Mar. 28, 1888				Toad, crawfish.
Do	Mar. 30, 1888			2 meadow mice	May beetle, other insects.
Do	Apr. 18, 1888				Empty.
Portland, Conn	Oct. 8, 1887			Mouse	
East Hartford, Conn	Apr. 6, 1888			Meadow mice	
Do	do	Ruffed grouse.			Garter snake.
Do	Apr. 20, 1888			Shrew; meadow mouse.	
Lockport, N. Y	June 11, 1888	Chicken.			
East Hartford, Conn					Empty.
The Plains, Va	Sept. 5, 1888				Insect.
Sandy Spring, Md	Oct. 2, 1888		Red headed woodpecker.	Pine mouse, gray squirrel.	2 cuterebrae and other insect.
Do	Nov. 11, 1888				Offal.
Do	Nov. 12, 1888			Shrew	Snake; grasshopper.
Do	Nov. 13, 1888				Empty.
Washington, D. C	Dec. 4, 1888			1 house mouse, 1 meadow mouse	
Cobham, Va	Dec. 1, 1888				Do.
Sandy Spring, Md	Dec. 9, 1888				Do.
Do	Dec. 19, 1888			Gray squirrel	
Do	Dec. 18, 1888			Mouse hair	
Do	do			2 meadow mice	
Do	Dec. 24, 1888				Offal.

Table showing the results of examinations of 562 stomachs of the Red-tailed Hawk (Buteo borealis)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md	Dec. 24, 1888			1 meadow mouse	
Do	Jan. 9, 1889				Indeterminate matter.
Do	Jan. 19, 1889			Mouse hair	
Do	do			do	
Do	Jan. 22, 1889				Empty.
Do	Feb. 3, 1889		Crow		
Do	Mar. 12, 1889				Empty.
Leopard, Pa	Mar. 10, 1888			2 meadow mice	
Sandy Spring, Md	Apr. 2, 1889			Gray squirrel	
Do	Apr. 4, 1889	Fowl			
Rayne, La	Mar. 5, 1889				6 crawfish; 1 frog.
Owego, N. Y	July 23, 1889			Rabbit, meadow mouse.	Adder, crawfish, grasshoppers, beetles.
Alfred Center, N. Y	May 28, 1889			Meadow mouse, 3 shrews.	
San Francisco Mountain, Arizona.	Aug. 3, 1889			1 Say's chipmunk.	
Do	Aug. 5, 1889			1 Rocky Mountain chipmunk.	
Do	do				Empty.
Do	Aug. 6, 1889				Do.
Do	Aug. 26, 1889			1 Say's chipmunk.	
Do	do			1 Rocky Mountain chipmunk, 1 white-footed mouse.	
Do	Sept. 1, 1889				4 large grasshoppers.
Do	Sept. 16, 1889			1 Say's chipmunk, 1 Rocky Mountain chipmunk.	
Do	Sept. 22, 1889			1 Rocky Mountain chipmunk.	2 grasshoppers.
Do	Sept. 24, 1889			do	
Do	Sept. 27, 1889			2 Rocky Mountain chipmunks.	
Do	Oct. 5, 1889			1 Abert's squirrel.	
Deming, N. Mex	Nov. 29, 1889			1 pocket rat	
Sandy Spring, Md	Nov. 17, 1889			Mouse hair	
Do	do	Poultry			
Do	do				Empty.
Do	Nov. 19, 1889				Do.
Do	do			1 shrew	
Do	Nov. 23, 1889			2 meadow mice; 2 shrews.	
Do	Nov. 29, 1889	Quail		Gray squirrel	
Do	Dec. 3, 1889				Do.
Do	Dec. 7, 1889			1 rat	
Do	Dec. 12, 1889			Meadow mouse	
Kalamazoo, Mich	1886	Poultry			
Do	1886			Gopher	
Do	1886			do	
East Bradford, Pa	May 10, 1886	Poultry			
Do	Aug. 28, 1886		Small bird		
Birmingham, Pa	Nov. 27, 1886			4 mice	
Alder Creek, N. Y	Sept. 22, 1886			Meadow mouse; porcupine.	Grasshoppers.
Woodland, Cal	May 24, 1886		Small bird	Rat	
Fort Hamilton, N. Y	Dec. 18, 1880		Shore lark	Mole	
Bayou La Barre, La	Dec. 8, 1888			Rabbit	
New Orleans, La	Jan. 30, 1889		King Rail		
Raleigh, N. C	Dec. 3, 1887				Empty.
Do	Feb. 14, 1888	Poultry			
Mount Carmel, Ind	Nov. 19, 1886			2 meadow mice	
Brookville, Ind	Nov. 22, 1886			Rabbit	
Do	Dec. 4, 1886			Short-tailed shrew.	
Adams, Ind	Jan. 4, 1887	Quail		Rabbit	
Union County, Ind	Jan. 11, 1887			White-footed mouse.	
Do	do			Mice	
Adams, Ind	Jan. 12, 1887			Meadow mouse	

Table showing the results of examinations of 562 stomachs of the Red-tailed Hawk (Buteo borealis)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Adams, Ind	Jan. 26, 1887			2 white-footed mice; 1 other mouse.	
Do	Jan. 27, 1887		Sparrow (?)	Meadow mouse	Crawfish.
Decatur County, Ind	Feb. 12, 1887			Skunk	Do.
Do	....do			4 meadow mice; 1 white-footed mouse.	
Springfield, Ind	Mar. 7, 1887				Frog.
Brookville, Ind	Mar. 19, 1887			2 white-footed mice.	
Do	Nov., 1887				Empty.
Do	Nov. 17, 1887			Rabbit	
Fairfield, Ind	Nov. 30, 1887	Chicken			
Brookville, Ind	Dec. 14, 1887	...do			
Whitcomb, Ind	Mar. 1, 1888				Garter snake.
Springfield, Ind	Mar. 7, 1888				Empty.
Do	....do				Do.
Rensselaer County, N. Y.	Nov. 23, 1878			Mouse hair	Frogs.
Do	Oct. 25, 1884				35 grasshoppers.
Do	Oct. 9, 1885			Meadow mice	
Do	Oct. 3, 1886				Grasshoppers.
Do	Oct. 28, 1887				Cricket.
Do	Oct. 29, 1887			White-footed mouse, 1 meadow mouse.	
Saratoga County, N. Y	Nov. 8, 1879			Red squirrel	Frog.
Albany County, N. Y	Nov. 3, 1884				Grasshoppers, garter snake.
Do	Nov. 8, 1886			2 rats	
Troy, N. Y	Nov., 1886				Empty.
Do	Dec. 19, 1887				Do.
Rensselaer County, N. Y.	Oct. 20, 1888				Frog, grasshoppers, crickets, other insects.
Do	Nov. 3, 1888			Meadow mice	Frogs, grasshoppers.
Jefferson, Md	Dec. 12, 1889			3 meadow mice	2 grasshoppers.
Gaylordsville, Conn	Jan., 1889			2 short-tailed shrews; 2 meadow mice.	
Jefferson, Md	Dec. 14, 1889	Fowl			
Sandy Spring, Md	Dec. 27, 1889			Meadow mouse	
Do	Jan. 8, 1890				Empty.
Do	....do			Meadow mouse	
Do	....do		Feathers		
Hale County, Ala	Jan. 4, 1890			Harvest mouse	
Lockport, N. Y	Jan. 29, 1890			Short-tailed shrew.	
Amagansett, N. Y	June 29, 1889			2 meadow mice	
Greensboro, Ala	Feb. 12, 1890			Cotton rat, 2 white-footed mice.	
Toronto, Canada	Feb. 17, 1890				Offal.
Sandy Spring, Md	Feb. 27, 1890				Empty.
Do	Mar. 10, 1890			1 short-tailed shrew, 2 meadow mice.	
Do	Mar. 13, 1890		2 song sparrows		Toad.
Do	Mar. 17, 1890			Short-tailed shrew.	
Do	Mar. 18, 1890				Empty.
Do	....do			Meadow mouse, pine mouse.	
Do	Mar. 24, 1890			Rabbit	
Do	....do			2 short-tailed shrews, 1 Cooper's mouse, 1 pine mouse.	
Do	Apr. 2, 1890			2 meadow mice	
Do	....do		Robin	2 meadow mice, 2 shrews.	
Do	Apr. 3, 1890			2 meadow mice	
Bellefontaine, Ohio	July 6, 1889	Poultry.			Snake, stag beetle, small beetles, crawfish, two fly larvæ.

Table showing the results of examinations of 562 stomachs of the Red-tailed Hawk (Buteo borealis)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Marfa, Tex	Jan. 21, 1890				Goat offal.
Do	do				Do.
Do	Jan. 20, 1890				Do.
Do	Jan. 21, 1890				Do.
Do	do			Rabbit	Do.
Do	do			do	
Do	do				Goat offal.
Do	Jan. 19, 1890		Bird	Rock squirrel	
Orange County, N. Y	Oct. 11, 1873	Ruffed grouse.			
Highland Falls, N. Y	Apr. 1, 1875				Empty.
Putnam County, N. Y	Apr. 5, 1879				Do.
Circleville, Ohio	Apr. 1, 1881				Do.
Camp Verde, Ariz	Apr. 10, 1884				Do.
Yavapai County, Ariz	Sept. 25, 1884			Arizona rabbit	
Do	do			do	
Mogollon Mountains, Ariz.	Oct. 5, 1884				Do.
Pine Springs, Ariz	Nov. 17, 1884			Rabbit	
Whipple Barracks, Ariz.	Nov. 25, 1884			Arizona rabbit	
Camp Verde, Ariz	Mar. 14, 1885				Do.
Yavapai County, Ariz	Mar. 25, 1885			Arizona rabbit	
Fort Lowell, Ariz	Apr. 5, 1885				Do.
Red Rock, Ariz	May 8, 1885				Small snakes.
Yavapai County, Ariz	May 19, 1885				Empty.
Camp Verde, Ariz	Aug. 24, 1885			Arizona rabbit	
Do	Aug. 25, 1885			Pocket gophers	
Yavapai County, Ariz	Aug. 27, 1885				Do.
Do	Sept. 13, 1885				Diamond rattle snake.
Camp Verde, Ariz	Oct. 10, 1885			Pocket gopher	
Do	Oct. 16, 1885				Striped snake.
Do	Dec. 18, 1885				Empty.
Do	Dec. 28, 1885				Do.
Do	Jan. 14, 1886			Arizona rabbit	
Upper Verde Valley, Ariz.	Mar. 9, 1886			Jack rabbit	
Camp Verde, Ariz	Mar. 12, 1886				Do.
Do	Sept. 7, 1886		Mourning dove		
Do	Oct. 17, 1886				Do.
Do	Nov. 25, 1886				Diamond rattle snake.
Do	Dec. 1, 1886			Arizona rabbit	
Do	do				Snakes.
Do	Dec. 11, 1886				Empty.
Do	do				Do.
Do	do			Pocket gopher	
Do	Dec. 13, 1886			do	
Do	Dec. 27, 1886				Do.
Oak Creek, Ariz	Jan. 6, 1887				Do.
Yavapai County, Ariz	Jan. 6, 1887			Wood rats	
Camp Verde, Ariz	Jan. 16, 1887	Gambel's quail.			
Do	do			Mexican wood-rat.	
Pecks Lake, Upper Verde Valley, Ariz.	Jan. 24, 1887	Pintail			
Camp Verde, Ariz	Mar. 31, 1887	Teal	Mourning dove		
Do	do				Do.
Upper Verde Valley, Ariz.	Apr. 16, 1887			Texas jack rabbit.	
Do	do			do	
San Francisco Mt., Ariz.	June 12, 1887			Say's chipmunk	
Do	June 13, 1887				Do.
Mogollon Mts., Ariz	July 15, 1887				Do.
Do	July 17, 1887			Abert's squirrel	
Tonto Basin, Ariz	Aug. 10, 1887			Arizona squirrel	Lizards.
Camp Verde, Ariz	Oct. 25, 1887				Small snake.
Do	do				Empty.
Do	Nov. 1, 1887				Do.
Do	Nov. 5, 1887				Do.
Do	Nov. 26, 1887				Grasshoppers, bull snake.
Upper Verde Valley, Ariz.	Dec. 8, 1887				Empty.
Camp Verde, Ariz	Jan. 7, 1888				Frogs.

Table showing the results of examinations of 562 stomachs of the Red-tailed Hawk (Buteo borealis)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Payson, Ariz	Feb. 10, 1888	Gambel's quail.		Kangaroo rat	
Yavapai County, Ariz	May 8, 1888				Small striped snake.
Vermillion, Clay County, S. Dak.	Apr. 1, 1890	Wild duck.			
Do	Apr. 9, 1890				Empty.
Do	....do			Striped gopher	
Sandy Spring, Md	Oct. 6, 1890	Fowl			
Do	Oct. 22, 1890	....do			
Plover Mills, Ontario	May 8, 1884			2 meadow mice	
Keokuk, Iowa	Dec. 22, 1889			Mice	
Sandy Spring, Md	Nov. 6, 1890			Meadow mouse	
Do	....do				8 grasshoppers.
Portland, Conn	Oct. 4, 1890			Red squirrel, shrew.	Larva.
Do	Oct. 22, 1890				Empty.
Sandy Spring, Md	Nov. 9, 1890			Chipmunk	
Do	....do			Red squirrel	Wood frog, spider, grasshopper, snake.
Do	Nov. 13, 1890				Empty.
Do	Nov. 15, 1890			Meadow mouse, short-tailed shrew.	Grasshopper.
Do	Nov. 17, 1890			House mouse	
Do	Nov. 18, 1890			Meadow mouse	
Do	Nov. 20, 1890				Empty.
Do	....do			2 meadow mice, 1 jumping mouse.	
Do	Nov. 28, 1890				Do.
Union County, Ky	Oct. 22, 1890	Chicken.			
Do	Nov. 5, 1890				Toad.
Sandy Spring, Md	Dec. 13, 1890				Empty.
Dover, N. J	Oct. 18, 1890			1 short-tailed shrew.	2 grasshoppers.
Morristown, N. J	Nov. 1, 1890			1 small shrew, 1 meadow mouse.	
Do	Nov. 15, 1890	Chicken.			
Morristown, N. J	Nov. 17, 1890				Empty.
Sandy Spring, Md	Dec. 29, 1890				Do.
Do	Jan. 10, 1891			1 meadow mouse, 1 small short-tailed shrew.	
Buffalo, N. Y	Oct. 22, 1890				5 grasshoppers.
Herrick, Pa	July 1, 1891			Chipmunk	Frog.
Drewrys Bluff, Va	Feb. 5, 1891			Mouse hair	
Washington, D. C	Nov. 20, 1891	Chicken.		Pine mouse	
Sandy Spring, Md	Dec. 1, 1891			Rabbit	
Do	Dec. 15, 1891				Empty.
Lancaster County, Pa	....do				Do.
Portland, Conn	Aug. 2, 1891			1 meadow mouse.	
Do	Oct. 31, 1891				Do.
Do	Nov. 12, 1891	Chicken.			
Sandy Spring, Md	Jan. 6, 1892			House mouse	
Fort Huachuca, Ariz	Apr. 30, 1892				1 striped snake, 5 centipeds.
Sandy Spring, Md	Jan. 11, 1891				Empty.
Do	....do			Mouse hair	
Do	Jan. 20, 1892			1 house mouse, 1 short-tailed shrew.	
Do	Mar. 14, 1892		3 juncos, 1 song sparrow.		
Do	Mar. 21, 1892		2 song sparrows, 1 junco.	2 meadow mice, 1 white-footed mouse.	
Do	Mar. 14, 1892			Gray squirrel	
Do	Mar. 17, 1892		1 junco, 1 song sparrow.	Mouse hair	
Do	Mar. 16, 1892				Do.
Do	Mar. 2, 1891				Do.
Do	Mar. 21, 1891			2 meadow mice	
Do	Mar. 14, 1891			1 meadow mouse, gray squirrel.	
Do	....do			1 rat, 1 house mouse, 2 meadow mice.	

Table showing the results of examinations of 562 stomachs of the Red-tailed Hawk (Buteo borealis)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md	Jan. 26, 1891	.....	.....	House mouse	
Do	Feb. 12, 1891	.....	.....	2 meadow mice	
Do	Jan. 26, 1891	.....	.....	3 meadow mice	
Do	Mar. 2, 1891	.....	.....	.....	Empty.
Do	Dec. 13, 1890	.....	.....	3 meadow mice	
Panamint Mts., Cal	June 23, 1891	.....	.....	Pouched gopher.	2 lizards, 5 grasshoppers, 1 mole cricket.
Walker Pass, Cal	July 3, 1891	.....	.....	.....	Empty.

SUMMARY.—Of 562 stomachs examined, 54 contained poultry or game birds; 51, other birds; 278, mice; 131, other mammals; 37, batrachians or reptiles; 47, insects; 8, crawfish; 1, centipeds; 13, offal; and 89 were empty.

RED-SHOULDERED HAWK.

Buteo lineatus.

[Plate 8—Adult.]

The Red-shouldered Hawk inhabits eastern North America from Nova Scotia and Manitoba ranging south to the Gulf of Mexico and west to the Great Plains.

A dark race (*Buteo lineatus elegans*) inhabits the Pacific slope, north to southern Oregon.

A small race (*Buteo lineatus alleni*) occurs from Florida to Texas, and extends south into Mexico. It is well to state here that, although the Texas and Mexican specimens are of the same size as typical Florida examples, they are much darker, owing to the increase of the rufous pigment in the plumage, thus approaching the *elegans* type in coloration.

It will be seen from the above outline of its distribution that a considerable portion of the dry interior of the United States, including the Great Plains region, is without a representative of this species.

The diet of the Red-shouldered Hawk is probably more varied than that of most other birds of prey. For example, the writer has found in the stomachs of the different individuals which have come under his notice the remains of mammals, birds, snakes, frogs, fish, insects, centipeds, spiders, crawfish, earthworms, and snails, which represent eleven classes of animal life. This Hawk is very fond of frogs, and, although these batrachians are mentioned by Audubon and other writers as forming a very considerable portion of their sustenance, yet mice furnish fully 65 per cent of their food. Besides this very injurious group of rodents, other small mammals, such as squirrels, young rabbits, shrews, and moles, are taken.

Some authors have stated that Hawks commonly commence on their prey by eating the entrails. The tame Hawk elsewhere mentioned, and others that have come under the writer's observation, invariably

Bull. No. 3. Div. Ornithology

RED-SHOULDERED HAWK

Buteo lineatus (Gmel)

Buteo lin.

Buteo lin.

Buteo lin.

ate the eyes and brains first, even when the animal's abdominal cavity was opened, and in most cases discarded the stomach and large intestines altogether.

Some authors insist that the Red-shouldered Hawk is destructive to poultry, but the writer in all his field experience has never seen one attack a fowl, nor has he found the remains of one in the stomachs of those examined. In making this statement, he does not include poultry which is eaten in the form of offal, for in severe weather when the ground is covered with snow and when food is scarce, the Red-shouldered Hawk will devour dead chickens which have been thrown out from the yard, as well as other refuse found on the compost heaps or in the vicinity of slaughterhouses. At such times the writer has often captured specimens of this Hawk, as well as of crows, blue jays, red and flying squirrels, in steel traps set near a piece of chicken, rabbit, or beef fastened in a tree.

In a communication received by the U. S. Department of Agriculture from Mr. J. Alden Loring, of Owego, Tioga County, N. Y., in September, 1889, he gives the following testimony in reference to this bird: "The pair reared their young for two years in a small swampy piece of woods about 50 rods from a poultry farm containing 800 young chickens and 400 ducks, and the keeper told me he had never seen the hawks attempt to catch one." It is extremely improbable that this slow-flying Hawk often captures birds, except such as are disabled.

Frogs are eagerly sought after. The tame Hawk mentioned below always took them in preference to anything else except a live mouse. Toads also furnish food for it, especially in the spring, when they are in the water spawning. Small and medium sized snakes are often found among the stomach contents, and occasionally the Hawk is seen flying with one of these reptiles dangling from the talons. Dr. C. Hart Merriam says: "I once took from the stomach of one of these hawks a snake (*Eutainia saurita*) measuring 22 inches in length." (Birds of Connecticut, 1877, p. 86.) Crawfish, in sections of the country where they abound, are often taken by this Hawk, as by most of the other *Buteos*. Maynard, after telling how this Hawk has learned to visit the poultry yard, states: "In Florida I found them feeding upon small mammals, reptiles, crabs, and other crustaceans." (Birds Eastern N. Am., p. 312.)

Among the insects which are destroyed in considerable numbers by this bird, may be mentioned grasshoppers, crickets, and various kinds of beetles and caterpillars. Even in December and early January, when apparently all insect life is in a dormant state, specimens of the Red-shouldered Hawk are found whose stomachs are filled with one or more species of these insects.

Mr. Benjamin Mortimer, whose observations were made in Florida, makes the following statement as to its food: "This is the most troublesome of the hawks among young chickens in Orange County. The

numerous bay-tree swamps are its favorite residence, as they serve as a safe stronghold, and also harbor myriads of cotton rats, which are a favorite prey with it. It would appear that this Hawk is not in the habit of molesting the common small birds, as I have observed numbers of Blackbirds fly into the same tree with one, neither party paying any attention to the other. The bold little Sparrow Hawk has no difficulty in driving this larger species, and I have seen a pair of Quail rout a Red-shoulder that had made a sally upon their brood." (Auk, vol. VII, 1890, No. 4, p. 339.)

The following is a summary of Dr. B. H. Warren's investigations: "In my examinations of fifty-seven of these Hawks which have been captured in Pennsylvania, forty-three showed field mice, some few other small quadrupeds, grasshoppers, and insects, mostly beetles; nine revealed frogs and insects; two, small birds, remains of small mammals, and a few beetles; two, snakes and portions of frogs. The gizzard of one bird contained a few hairs of a field mouse and some long black hairs which appeared very much like that of a skunk. The bird on dissection gave a very decided odor of polecat. In two of these Hawks, shot in Florida, I found in one portions of a small catfish, and in the other remains of a small mammal and some few coleopterous insects." (Birds of Pennsylvania, 1888, p. 89.)

To sum up, the food of this Hawk consists of at least 65 per cent of small rodents, which are very injurious to the farmer, and less than 2 per cent of poultry. It seems hardly necessary to more than mention this fact to intelligent persons to convince them of the folly and shortsightedness of destroying this valuable bird, and of the necessity of fostering and protecting it in the farm lands and orchards.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.	BIRDS.
Blarina brevicauda.	*Porzana carolina.*
Blarina b. carolinensis.	*Colinus virginianus.*
Blarina exilipes.	*Zenaidura macroura.*
Evotomys gapperi.	*Megascops asio.*
Arvicola riparius.	*Colaptes auratus.*
Arvicola pinetorum.	*Corvus americanus.*
Mus musculus.	*Sturnella magna.*
Sitomys americanus.	*Ammodramus s. savanna.*
Didelphis virginianus.	*Spizella pusilla.*
Lepus sylvaticus.	*Junco hyemalis.*
Scalops aquaticus.	*Melospiza fasciata.*
Tamias striatus.	*Passerella iliaca.*
Sciurus hudsonicus.	*Passer domesticus.*
Sorex.	*Merula migratoria.*
Fiber zibethicus.	
Mephitis mephitica.	

The species seems to be rather more hardy than the Red-tail; at least it winters a little farther north, being found more or less commonly as

far as parallel 43° at that season. According to Mr. McIlwraith it is not found in Ontario in winter. It breeds throughout the entire range. From New England southward it is the most abundant breeder of any of the rapacious birds, and in Connecticut and the southern portions of New York it is safe to say that its nests outnumber those of all the other birds of prey combined. Usually by the middle of March it begins to build its nest, there being very little difference in the time of commencing between New England and Texas, though Maynard tells us that in Florida it has eggs in February. It breeds a trifle later than the Red-tail, so full complements of eggs are found usually from the middle of April to the first of May. Most collectors give three eggs as the average number for a set, though the writer, from his somewhat limited observations in southern New York, does not remember ever finding less than four, and five was not an uncommon number. Dr. William Wood mentions a set containing six. Incubation, as with most of the other Hawks, occupies less than twenty-eight days.

The nest closely resembles that of the crow, except that it is larger and lacks the compact and neat appearance common to the nest of the latter bird. It is composed of coarse sticks loosely placed together with finer ones toward the central cavity, which is lined with the bark of the grape vine and other fibers, or, in some cases, with pieces of the rough outer bark of the oak and hickory, and not uncommonly, as with many of the other birds of prey, green twigs with the leaves attached are used. Bottom lands grown up with large deciduous trees, or the neighboring hillsides, are the favorite nesting sites of this bird. The nest is placed in one of the larger trees, 40 to 80 feet from the ground, and usually in the fork where the main branches diverge from the trunk. A pair will inhabit the same locality for years, and often occupy a nest for several seasons. The male assists in building and incubating as well as in feeding the young, and, in cases where the female is killed, will rear the brood alone. It is stated that this species remains mated through life, and that even during the winter months mates appear very much attached to each other, differing in this respect from the Red-tail.

Except during the breeding season, when it is confined mostly to the woods, the Red-shouldered Hawk frequents the low lands bordering streams and marshes, and in the winter months one or more are likely to be found where open springs exist, watching for frogs, their favorite food.

Apparently it is less shy than the Red-tail; nevertheless, under ordinary circumstances it will not allow a man on foot to approach within gun range. Like other Hawks, it shows no fear for one on horseback or in a wagon, and in this way can be easily approached.

This Hawk, like most other birds of prey, makes a very interesting pet, and on account of its varied food is easy to keep. The writer once reared, and kept for a year or more, one which was taken from a nest when only a few days old. It finally had to be killed because of its

fierceness towards strangers, although it was never vicious towards its owner. When no other person was present it would alight on its owner's shoulder and show signs of contentment and pleasure by uttering a low musical note and by caresses, which consisted in gently passing his ear or a lock of hair between its bill very much as it did its own feathers in the act of pluming itself.

The flight of this Hawk, especially that of the immature birds, is heavy in character and suggests that of the owls.

DESCRIPTION.

Outer web of outer wing feathers distinctly spotted with white, buffy, or yellowish. Shoulders always more or less rusty.

Adult.—Head, neck, and lower parts more or less rusty or cinnamon, transversely spotted or barred with whitish; tail black, crossed by about six bands of white. Above reddish brown, the center of the feathers darker than the edges.

Immature.—Lower parts dull whitish, longitudinally spotted or streaked with dark brown; tail dusky, crossed by numerous narrow bands of dull buffy or grayish brown.

Length: 17.50 to 22 inches (445 to 559^{mm}); extent, 39 to 44 inches (990 to 1117^{mm}); wing, 11.25 to 14.25 inches (285 to 362^{mm}); tail, 8 to 10 inches (203 to 254^{mm}).

Table showing the results of examinations of 220 stomachs of the Red-shouldered Hawk (Buteo lineatus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sing Sing, N. Y.	Oct. 3, 1885		Flicker		Toad, snake, cricket, larva.
Alfred Center, N. Y.	Sept. 11, 1885			Mouse	Grasshopper, larva, spider.
Do.	Sept. 13, 1886			4 shrews	Grasshoppers, spider.
Do.	Sept. 12, 1886				Grasshoppers.
Peterboro, N. Y.	June 25, 1886				Frogs, beetles.
Do.	do			Red-backed mouse, 3 shrews.	
Do.	June 28, 1886			Meadow mouse, 3 shrews.	Beetles, crawfish, spider.
Do.	do			1 shrew	
Do.	July 28, 1886				Insects.
Oneida Lake, N. Y.	Aug. 30, 1886				Squash bug.
Morrisville, N. Y.	Sept. 6, 1886			Meadow mouse, 1 shrew.	10 grasshoppers.
Birmingham, Pa.	Mar. 15, 1886		Feathers		
Chester County, Pa.	Jan. 3, 1886				Cricket, larva, 2 spiders.
East Hartford, Conn.	Dec. 14, 1886			Meadow mouse	Frog.
Gainesville, Fla.	Feb. 28, 1887				Do.
Do.	Mar. 17, 1887				Frog, dragon flies.
Do.	Apr. 7, 1887				Lizard, 2 crickets, larva of beetles.
Do.	Apr. 11, 1887				Snake, insects, earth worm.
Greensboro, Ala.	Nov. 19, 1887				Grasshopper, crickets.
East Hartford, Conn.	Apr. 5, 1887			Shrew	Garter snake, bull-frog.

Table showing the results of examinations of 220 stomachs of the Red-shouldered Hawk (Buteo lineatus)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
East Hartford, Conn	July 5, 1887			Meadow mouse	Beetle, wasp, larva.
Portland, Conn	Oct. 29, 1887				Leopard frog.
Washington, D. C	Dec. 24, 1887			House mouse, 2 meadow mice.	Crawfish.
Do	....do			Meadow mouse, shrew.	Frog, grasshoppers.
Do	Jan. 22, 1888				Empty.
Greensboro, Ala	Feb. 16, 1888				Grasshoppers, beetles.
Locust Grove, N. Y	Aug. 24, 1876				Grasshoppers.
Sing Sing, N. Y	Apr. 8, 1880			Mouse	
Do	May 6, 1880			Meadow mouse, shrew.	2 toads, grasshopper.
Do	Sept. 19, 1882				Toad, larvæ.
Do	Feb. 2, 1884			2 shrews	Frog, salamander.
Do	Feb. 14, 1885			Mole	
Do	Apr. 2, 1885			Meadow mouse, shrew.	
Portland, Conn	Oct. 18, 1886			Mice	
East Hartford, Conn	Oct. 29, 1886			Mole	
Sandy Spring, Md	Jan. 8, 1887			House mouse	
Do	....do			2 house mice, white-footed mouse, 1 meadow mouse.	
Do	Jan. 28, 1887			4 meadow mice	
Do	Feb. 11, 1887			Pine mouse, meadow mouse, shrew.	Tree-frog, beetle, spider.
Do	Mar. 8, 1887			House mouse	
Do	....do			Mouse	
Do	....do			2 meadow mice	
Do	Mar. 24, 1887		Screech-owl	Meadow mouse	
Do	Nov. 26, 1887				Grasshoppers beetles, spider.
Do	Dec. 3, 1887			Meadow mouse	Grasshopper.
Do	....do			Pine mouse	
Do	Dec. 9, 1887			Meadow mouse	
Do	Dec. 27, 1887			4 meadow mice	
Do	Jan. 30, 1888			1 mole	
Do	....do		Field sparrow		
Do	....do		Carolina dove	Meadow mouse	
Chester County, Pa	Nov. 23, 1886			2 meadow mice	Grasshopper.
Do	Jan. 20, 1886				Insects.
Do	Apr. 3, 1886			Opossum	Crickets, larvæ.
Do	Nov. 29, 1886			Mouse	
Do	Dec. 1, 1886			Meadow mouse	
Do	Dec. 2, 1886			....do	
Do	Dec. 15, 1886			Shrew	
Do	Dec. 16, 1886			Meadow mouse	
Do	Jan. 21, 1886			5 meadow mice	
Do	Jan. 26, 1887			....do	
Do	Jan. 28, 1887			Mouse	
Do	Jan., 1887			....do	
Do	....do			....do	
Do	Dec. 18, 1886			Meadow mouse, rabbit.	
Do	Dec. 20, 1886			Meadow mouse	Larva, offal.
Do	Jan. 18, 1887			....do	
Do	....do				Empty.
Do	Jan., 1887			Meadow mouse	
Do	Feb., 1887			3 meadow mice	
Willistown, Pa	Feb. 20, 1881			Mice	
Do	Mar. 3, 1881			Rabbit	
Pennsylvania	Dec. 20, 1879			Mice	Grasshoppers.
West Chester, Pa	Dec. 9, 1879			....do	Do.
West Pikeland, Pa	....do				Do.
Westtown, Pa	Feb. 4, 1878			Mice	Do.
Do	Feb. 4, 1879			....do	Do.
Willistown, Pa	Jan. 21, 1879				Empty
Volusia County, Fla	Mar. 18, 1886				Catfish.
St. Johns River, Fla	Mar. 14, 1886			Mice	Insects.
Milltown, Pa	Dec. 29, 1884			....do	
Thornburg, Pa	Jan. 8, 1885			....do	Do.
Westtown, Pa	Jan. 10, 1879			....do	
Do	Jan. 28, 1879			....do	
Do	Feb. 20, 1879			....do	

Table showing the results of examinations of 220 stomachs of the Red-shouldered Hawk (Buteo lineatus)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Westtown, Pa	Jan. 27, 1879			Mice	Insects.
Do	Feb. 4, 1879			do	
Do	Feb., 1879			do	
Do	Feb., 1878			do	
Willistown, Pa	Apr. 3, 1877			do	
Chester County, Pa	Nov. 30, 1879				Do.
Pennsylvania	Jan. 5, 1881			Mice	
Barton, N. Y	Jan. 1, 1886			3 mice	
Elmira, N. Y	Jan. 21, 1886	Chicken			
Do	Apr. 5, 1886			Field mice	
Do	Aug. 13, 1887			Skunk	
Big Flats, N. Y	Sept. 5, 1887				Grasshoppers, beetles.
Corning, N. Y	Sept. 23, 1887			Field mice	Insects.
Greensboro, Ala	Feb. 25, 1888			Mouse	Lizard, grasshopper, cockroach, 3 crawfish.
Sandy Spring, Md	Mar. 17, 1888			Meadow mouse	
Gainesville, Fla	Jan. 4, 1888				Spider.
Do	Jan. 18, 1888				4 mole crickets, 20 larvæ.
East Hartford, Conn	Sept. 22, 1887				1 frog, 1 garter snake, 1 larva of elm sphinx, 1 larva purslane sphinx, 7 crickets, and other insects.
Do					Frog.
Do	Nov. 1, 1887			Meadow mouse	Frog, lepidopterous larvæ.
Do	Jan. 10, 1888			Shrew	
Stratford, Conn	Oct. 17, 1888			Hair of small mammal.	Frog.
Sandy Spring, Md	Nov. 19, 1888				1 grasshopper.
Fairmont, W. Va	Sept. 21, 1888				Empty.
Cobham, Va	Dec. 1, 1888				46 grasshoppers, 2 crickets, 30 beetles.
Sandy Spring, Md	Dec. 5, 1888				10 grasshoppers.
Do	Dec. 11, 1888			Meadow mouse	10 grasshoppers, 2 crickets, 4 beetles, 2 lepidopterous larvæ.
Do	Dec. 15, 1888			Shrew	
Do	Dec. 21, 1888			House mouse	
Do	Dec. 22, 1888			Pine mouse	Grasshopper.
Do	Dec. 27, 1888			1 meadow mouse, 2 pine mice.	2 beetles, 6 salamanders.
Do	Jan. 4, 1889				White grub.
Do	Jan. 10, 1889			1 shrew	2 beetles.
Do	Jan. 21, 1889		Meadowlark		
Do	Jan. 24, 1889	Quail		Meadow mouse	
Do	Feb. 9, 1889				Empty.
Micco, Brevard Co., Fla	Dec. 10, 1888		Sora rail, sparrow.		Grasshoppers, snake, turtle.
Hale County, Ala	May 25, 1889	Chicken			Green snake.
Great Neck, L. I., N. Y	Apr. 30, 1889				Beetles.
Hale County, Ala	Apr. 10, 1889				20 crickets, 2 grasshoppers, 4 spiders, 1 beetle, 3 lepidopterous larvæ.
Do	Aug. 19, 1889			Mouse	1 cicada, 1 crawfish, 1 lizard.
Owego, Tioga County, N. Y.	Sept. 11, 1889			Chipmunk, shrew.	2 katydids, beetles, 7 sphinx larvæ.
Do	Sept. 10, 1889				Frog, 2 spiders, 1 katydid, 6 grasshoppers, 10 lepidopterous larvæ, beetles.
Do	Aug. 3, 1889				Frog, toad, beetles, and other insects

Table showing the results of examinations of 220 stomachs of the Red-shouldered Hawk (Buteo lineatus)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Owego, Tioga County, N. Y.	Sept. 24, 1889			Meadow mouse	1 tree toad, water snake, 2 ribbon snakes, 3 katydids, 4 crickets, 16 grasshoppers.
Greensboro, Ala	Sept. 19, 1889				Sphinx larva.
Do	Sept. 28, 1889				30 crickets, 5 grasshoppers, 1 katydid, sphinx larva, 1 lizard.
Alfred Center, N. Y	Apr. 21, 1889			3 short-tailed shrews.	
Sandy Spring, Md	Nov. 23, 1889			1 pine mouse	
Do	Dec. 5, 1889		Junco, fox sparrow.		Grasshopper.
Do	Dec. 8, 1889			Meadow mouse	
Do	Dec. 13, 1889				3 grasshoppers.
Canton, N. Y	Oct. 26, 1888				Ribbon snake, ring-necked snake.
Kalamazoo, Mich	Apr. 17, 1886				Striped snake.
Newtown, Conn					
Morristown, N. J	Apr. 2, 1886			Meadow mice	Pickerel, snake, 2 frogs.
Schraalenburg, N. J	May, 1882				Snake, toad.
West Farms, N. Y	Sept. 14, 1884				Beetles.
Do	Sept. 22, 1885			Mole	Katydid, spider.
Cincinnati, Ohio	Dec. 4, 1884				Grasshoppers.
Do	Nov. 13, 1884				Do.
Do	Dec. 2, 1884			Mice	Do.
Adams, Ind	Feb. 5, 1887			Rabbit, mouse	
Raleigh, N. C	Sept. 1, 1885				1 toad, 1 spider, 1 mole-cricket, grasshoppers, beetle.
Do	Feb. 23, 1886				Empty.
Do	Mar. 11, 1886			Meadow mouse	Lizard, 2 spiders.
Do	Sept. 17, 1886				Cicada.
Do	Sept. 21, 1887				4 frogs, cicada, katydid, grasshoppers, lepidopterous larvæ.
Do	Feb. 28, 1888			Meadow mouse	
Do	July 18, 1888				Toad, frog, grasshoppers.
Do	Aug. 7, 1888				Frogs.
Rensselaer County, N. Y.	Sept. 23, 1878			Mouse	
Do	Dec. 12, 1878			Mice	
Do	Aug. 20, 1887				Empty.
Do	May 18, 1888			Small mammal	
Troy, N. Y	Oct. 25, 1880			Meadow mouse	
Albany, County, N. Y	Nov. 29, 1880				3 frogs.
Do	Mar. 30, 1883			Mice	Frogs.
Do	Nov. 6, 1888			Small mammal	2 frogs, striped snake, grasshoppers.
Saratoga County, N. Y.	Nov. 5, 1888			Mice	
Rensselaer County, N. Y.	May 6, 1889				Frogs, insects.
Hale County, Ala	Nov. 26, 1889			Two house mice	1 mantis, 1 grasshopper.
Sandy Spring, Md	Dec. 27, 1889				Larva.
Do	Jan. 10, 1890				1 cricket.
Do	....do				Salamander, 4 larvæ.
Hale County, Ala	Dec. 28, 1889			House mouse	3 grasshoppers, 1 cricket.
Ercildoun, Pa	Feb. 17, 1889				Offal, vegetable matter.
Sandy Spring, Md	Feb. 16, 1890		Robin		5 beetles.
Do	Feb. 21, 1890			2 meadow mice	Spider.
Do	....do				2 beetles, 1 grasshopper, 1 spider, 1 larva.

Table showing the results of examinations of 220 stomachs of the Red-shouldered Hawk (Buteo lineatus)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Greensboro, Ala	Jan. 28, 1890				Lizard, turtle, beetle, grasshopper, 1 larva.
Morristown, N. J	Feb. 10, 1890			Mouse hair	
Sandy Spring, Md	Mar. 21, 1890			Short-tailed shrew.	Beetle remains.
Do	Sept. 24, 1890				Empty.
Plover Mills, Ontario	June 25, 1883				Crawfish.
Portland, Conn	Sept. 29, 1890				Pickerel.
Do	do				Empty.
Do	Oct. 8, 1890			Short-tailed shrew, 2 meadow mice.	2 frogs, small snake, cricket, larva, grasshopper.
Do	Oct. 11, 1890			Meadow mouse, 3 short-tailed shrews.	2 katydids, 10 tree frogs, 2 dung beetles, 1 beetle, 2 red-backed salamanders.
Do	Oct. 21, 1890				2 leopard frogs.
Sandy Spring, Md	Nov. 9, 1890			Shrew	
Do	Nov. 13, 1890			Red squirrel	Tree frog.
Do	do				Ants, other insects.
Do	Nov. 15, 1890			2 meadow mice	2 mole crickets, 25 grasshoppers, 4 beetles.
Do	Nov. 3, 1890				2 grasshoppers, 1 spider.
Do	Nov. 14, 1890				Grasshopper.
Sandy Spring, Md	Dec. 1, 1890				Empty.
Morristown, N. J	Sept. 11, 1890		Song sparrow		5 crickets, 2 dragon flies, 2 beetles.
Do	Sept. 20, 1890		Small bird		Sphinx larva, beetle.
Horse Hill, N. J	Oct. 29, 1890			1 short-tailed shrew.	1 garter snake.
Morristown, N. J	Nov. 1, 1890			Small shrew.	
Morris Plains, N. J	Nov. 11, 1890				2 frogs.
Do	Nov. 15, 1890				Frog.
Do	do			9 house mice, 1 meadow mouse.	
Do	Nov. 28, 1890			Meadow mouse, muskrat.	
Sandy Spring, Md	Jan. 1, 1891			Short-tailed shrew.	
Do	Jan. 10, 1891				Empty.
Do	do			1 meadow mouse	
Do	Jan. 26, 1891			do	
Do	Dec. 15, 1891			do	
Do	Mar. 15, 1892			Short-tailed shrew.	1 spider, 1 crawfish.
Lancaster County, Pa	Mar. 3, 1892			Meadow mouse	
Farmington, Conn	Oct. 5, 1891			do	1 grasshopper, 1 frog.
Portland, Conn	Apr. 17, 1892				1 frog.
Sandy Spring, Md	Mar. 25, 1892		Crow feathers		May beetle.
Do	Jan. 30, 1892			Meadow mouse	
Do	Jan. 11, 1891				Empty.
Do	do				Do.
Do	do				Do.
Do	Jan. 22, 1892			Meadow mouse, 2 small shrews.	
Do	Jan. 14, 1891			Meadow mouse	
Do	do			do	
Do	Mar. 2, 1892			do	
Do	Mar. 14, 1891			do	Crawfish.
Ponca Agency, Oklahoma.	Aug. 5, 1892				35 grasshoppers, 4 cicadas, beetles.

SUMMARY.—Of 220 stomachs examined, 3 contained poultry; 12, other birds; 102, mice; 40, other mammals; 20, reptiles; 39, batrachians; 92, insects; 16, spiders; 7, crawfish; 1, earthworms; 2, offal; 3 fish; and 14 were empty.

ZONE-TAILED HAWK.

Buteo abbreviatus.

The Zone-tailed Hawk ranges from southern California, Arizona, New Mexico, and Texas south to northern South America. The first specimen taken within our limits was secured by Dr. J. G. Cooper 30 miles north of San Diego, Cal., February 23, 1862.

Little has been written on the food habits of this Hawk. Dr. E. A. Mearns, in his interesting paper on this species in central Arizona at the northern part of its distribution, gives the following: "I frequently observed them throughout the entire year beside the Verde River, where they capture lizards, frogs, fishes, and other desirable articles of raptorial diet." (Auk, vol. III, 1886, p. 66.)

Mr. F. Stephens saw one hover over the water and attempt to catch small minnows. (Bull. Nutt. Ornith. Club, vol. VIII, 1883, p. 30.) It inhabits the country near the base of mountains in the vicinity of streams, and at no season is it found at a great distance from water. It breeds in suitable localities throughout its range. The nest is placed in a cottonwood or other suitable tree, usually in one of the main forks, from 20 to 50 feet from the ground, though sometimes it is saddled on a limb some distance from the trunk. Like other large Hawks, it constructs its nest of sticks, which are loosely put together, and adds a sparse lining of leaves, dry grass, or Spanish moss.

The eggs are deposited early in May, and are usually two in number, though three are occasionally found. Both birds assist in incubation as well as in other duties connected with rearing their young.

DESCRIPTION.

Plumage uniform black or blackish-brown; tail black, crossed by three broad zones, which are ash-gray on outer webs and pure white on nner.

Length: 18.50 to 21.50 inches (470 to 545^{mm}); extent, 49.50 to 53.25 inches (1257 to 1352^{mm}); wing, 15 to 17.40 inches (380 to 442^{mm}); tail, 8.50 to 10.75 inches (216 to 273^{mm}).

Table showing the results of examinations of 5 stomachs of the Zone-tailed Hawk (Buteo abbreviatus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
New River, Ariz	May 16, 1885				Frog, lizards.
Do	do				Frogs, lizards.
Agua Fria, Ariz	May 17, 1885				Tree toads, frog.
Camp Verde, Ariz	May 28, 1884				Empty.
Do	do				Hump-backed sucker.

SUMMARY.—Of 5 stomachs examined, 2 contained reptiles; 3, batrachians; 1, fish; and 1 was empty

WHITE-TAILED HAWK.

Buteo albicaudatus.

This Hawk inhabits the territory from eastern South America north to southern Texas. The first specimen taken within our limits was shot by Mr. G. B. Sennett near Corpus Christi, Tex., March 27, 1878, since which time it has been found not uncommon in the lower Rio Grande Valley. Mr. William Lloyd's records for western Texas in fall and winter undoubtedly refer to the Ferruginous Rough-leg. (Auk, vol. IV, 1887, pp. 188, 189.)

Very little has been written on the food of this Hawk, but presumably it does not differ much from that of the Red-shouldered Hawk. Mr. G. B. Benners says its food consists of snakes, frogs, rabbits, and quails. (Ornithologist and Oologist, vol. XII, 1887, p. 68.)

The White-tailed Hawk breeds along the sand ridges near the coast, and usually places its nest in a Spanish bayonet (yucca) or other low plant from 5 to 10 feet from the ground. The nest is a bulky affair, often several feet in diameter, although the cavity is small, and just sufficient to accommodate the bird. The greater mass of the structure is composed of sticks and coarse herbage, while the lining is made up of dry grass and small fibers. The eggs, which are usually two in number, rarely three or four, are deposited in the early part of May, and the young are found about the 1st of June.

The bird is quite shy and difficult to secure, and when its nest is approached will circle about out of gun range.

DESCRIPTION.

Tail less than half as long as wing. Three outer wing feathers with inner web distinctly cut out. Tail, and the feathers covering it, white, crossed near the end with a broad band of black, in front of which are numerous narrow broken lines of blackish. Above, blueish-gray or slaty; front of shoulders rufous; rump and lower parts white; throat sometimes dusky.

Length: 23 to 24 inches (584 to 609^{mm}); extent, 48 to 54 inches (1220 to 1372^{mm}); wing, 14.50 to 17.75 inches (368 to 450^{mm}); tail, 7.50 to 10.30 inches (190 to 261^{mm}).

SWAINSON'S HAWK.

Buteo swainsoni.

[Plate 9—Adult.]

Swainson's Hawk inhabits western North America, ranging from Alaska and the Mackenzie River district south through middle America and the greater part of South America to the Argentine Republic. In North America it extends east to Hudson Bay, Wisconsin, Illinois,

SWAINSON'S HAWK

Bonap.

and Arkansas, and is accidental in New England. Throughout the northern part of its range and as far south as South Dakota and Nebraska it is a migratory species. A few winter near parallel 43°, but the majority pass south of that latitude by the latter part of October and return the following March or early April.

The food of this Hawk, like that of the other *Buteos*, is extremely varied, but generally consists of more insect matter than is usually the case in birds of prey of this group. Besides insects, it feeds extensively on gophers (ground squirrels) and other small rodents, reptiles, batrachians, and occasionally on birds. It very rarely touches poultry, though Mr. H. Nehrling says that in Texas it commits great havoc among this class of birds. (Bull. Nutt. Ornith. Club, vol. VII, 1882, p. 174.) It is probable that this author has been misinformed, as the majority of writers state the contrary. It is quite rare for them to touch small birds, and the following notes will show in what perfect harmony it often lives with other species.

Capt. Charles E. Bendire says: "Lieut. Benson writes me that after the Arkansas king birds (*Tyrannus verticalis* Say) began to build he invariably found one of their nests in any tree that contained a Swainson's hawk's nest. In one case, a pair of these birds had placed their nest directly under and but 8 or 9 inches from that of the hawk. A pair of white-rumped shrikes (*Lanius ludovicianus excubitoroides* Swains.) built also immediately below one of these hawks' nests." (Proc. U. S. Nat. Mus., vol. x, 1887, p. 553.)

Dr. W. J. Hoffman says: "The only nest with eggs observed was one near Antelope Creek [Nevada], which was built near another of *Icterus bullocki*. In this instance both were breeding, and the latter evinced no fear of their neighbors, as one would occasionally fly back and forth from the nest immediately over that occupied by the hawk." (Bull. U. S. Geol. and Geog. Surv. Ter., Hayden, vol. VI, 1881, p. 243.)

Among the smaller mammals, spermophiles form a very important item in the bill of fare, and at certain seasons of the year constitute the greater part of the food of this hawk. The following, from the pen of Mr. H. W. Henshaw, bears on the subject: "Camping here [San Fernando Valley, Cal.] one evening our attention was directed to the great number of gophers (*Spermophilus beecheyi*) which in large colonies inhabited some barren hills near the station. Toward dusk the place was visited by at least a dozen of these birds, which took up their positions on the hillocks thrown up by the animals in front of their burrows, and awaited with patience the moment when a favorable opportunity should occur to snatch a supper. Elsewhere I have frequently seen them thus employed, and their persistence in destroying these pests should entitle them to due consideration at the hands of the farmer. Large number of insects, particularly grasshoppers, are destroyed by these birds, whose abilities as purveyors of food are thus of

the lowest order. (Appendix JJ Ann. Rept. of the Chief of Engineers U. S. A. for 1876, pp. 263, 264.)

The following by Mr. Robert Ridgway relates to the food of this hawk in Utah: "We found it [the nest] so filled with the accumulated remains of animals carried to the young that scarcely any depression was noticeable on the top, the decomposing rubbish consisting of bones and other remnants of small hares (*Lepus artemisia*), ground squirrels (*Spermophilus lateralis*, *S. harrisi*, and *Tamias quadrivittatus*), and, strange to say, a full-grown young Sparrow Hawk (*Falco sparverius*). * * * In one of these nests, found July 2, was a single young one, which, although yet covered with snow-white cottony down, was savagely tearing at a dead weasel which had been carried to the nest by the old birds, both of which were killed; * * * the food of this Hawk is by no means confined to small mammals and birds, but during the flights of the grasshoppers, which so often devastate the fields of Utah and other portions of the West, they keep continually gorged on these insects; and at one season we found them living chiefly on the large cricket so common in Salt Lake Valley. On the 31st of May, 1869, at Salt Lake City, we noticed a number of these hawks on the ground, where they remained most of the time quiet, but every now and then they would raise their wings and hop briskly in pursuit of some object, which at the distance, we could not distinguish. Cautiously approaching them, four were shot during the forenoon; they would not allow us to walk to within gunshot, but after flying for a few minutes would sometimes return toward us, and, passing by, give us a fair opportunity for wingshots. Upon dissection, the stomachs of these specimens were found to be filled entirely with the large crickets mentioned above." (U. S. Geol. Explor. of the 40th Paral., King, vol. IV, 1877, pp. 585–587.)

Mr. E. W. Nelson, speaking of the food of this hawk in Alaska, says: "He [Dr. Dall] found the bones of rabbits, squirrels, mice, and ducks, and even part of a whitefish, in the vicinity of their nests, showing that they are ready to prey upon anything that falls in their way." (Rept. Nat. Hist. Collections in Alaska, 1887, p. 142.)

Dr. Coues gives the following information on the food: "The quarry of Swainson's buzzard is of a very humble nature. I never saw one stoop upon a water-fowl or grouse, and though they probably strike rabbits, like the red-tails, their prey is ordinarily nothing larger than gophers. * * * I scarcely think they are smart enough to catch birds very often. I saw one make the attempt on a lark-bunting. * * * But I question whether, after all, insects do not furnish their principal subsistence. Those I shot after midsummer all had their craws stuffed with grasshoppers." (Amer. Nat., vol. VIII, 1874, p. 285, 286.)

The benefit it does to the farmer by destroying vast numbers of gophers probably does not exceed that which it does in clearing his fields of noxious insects, notably grasshoppers and crickets.

Mr. H. W. Henshaw gives the following note in reference to the usefulness of this species: "The crops of all those shot were crammed with grasshoppers; and, as these insects were very abundant, the hawks, as a matter of course, were very fat." (Explor. West of the 100th Merid., Wheeler, vol. v, 1875, p. 422.)

In a communication from Capt. Platte M. Thorne, dated January 3, 1889, from Fort Lyon, Colo., he says: "On July 30, 1887, shot a Swainson's hawk, which seemed too gorged to fly; stomach contained a great number of large grasshoppers. July 31 shot another whose stomach contained part of a gopher and a great many grasshoppers. August 30 saw about thirty Swainson's hawks, which were on the ground and apparently feeding. One shot had about as many grasshoppers in the stomach as would fill a tumbler heaping full."

Mr. Charles F. Morrison, also writing from Colorado, says: "In the fall grasshoppers form the principal diet of this species, although gophers and small birds also are fed upon." (Ornith. and Oologist, vol. XIV, 1889, p. 8.)

Dr. C. Hart Merriam, in the Forest and Stream of December 27, 1888, page 455, gives a very interesting account of a flock of these birds which he saw feeding on grasshoppers in Oregon in the summer of 1888, which is here added: "During the evening of August 20, 1888, Mr. H. W. Henshaw and I drove from Pendleton to the Umatilla Indian Agency, in northeastern Oregon, about 50 miles east of the Great Bend of the Columbia. It had been so hot during the day, the thermometer standing at 104° in the shade, that we were unable to go out. Driving along the crest of the plateau just south of the Umatilla River, at about sundown, we were astonished to see a very large number of large hawks hopping about on the ground, catching grasshoppers. We counted about 150 of these hawks, and there must have been at least 200 in the immediate neighborhood. At first we took them to be rough-legs, but later ascertained that nearly if not all were Swainson's hawks (*Buteo swainsoni*). The period between sundown and dark in that region is so short that the birds were still catching grasshoppers when overtaken by darkness.

"About 6 o'clock the next morning I visited the same place and was gratified to find the hawks engaged in making their breakfast of grasshoppers. They were scattered over a larger area than when we saw them the previous evening. Before 8 o'clock most of them had left the hills and settled down for the day in the poplar trees along the river bottom. Here I found the trees literally full of hawks, and counted as many as thirteen in one tree. Two of the three whose stomachs were examined contained grasshoppers and no other food. The third contained, in addition to grasshoppers, the head of a meadow mouse of the genus *Arvicola* (subgenus *Chilotus*). One contained 88 grasshoppers, another 96, and the third 106. Most of the grasshoppers were a

large species of *Œdipoda*, though a few belonged to the genus *Caloptenus*.

"Assuming that each hawk captured 200 grasshoppers a day and that there were 200 hawks, the daily catch would be 40,000 grasshoppers. At this rate these hawks would destroy 280,000 grasshoppers in a week and 1,200,000 in a month. I have no means of knowing how long the hawks remained in the neighborhood of Pendleton, but was told that they had been there before our visit. When in southern California about a month later I was told by Mr. Edward Merriam that on three occasions he had noticed similar gatherings of hawks in San Diego County. Once he saw a flock of several hundred large hawks catching crickets in cracked adobe soil in the San Marcos Valley. At night the hawks came into the live oaks at the head of the valley to rest. He shot one and found its stomach packed full of large black crickets. On two other occasions he saw large flocks of these hawks similarly engaged in catching the same species of crickets. The time was during the latter part of September.

"Mr. Angel, of San Luis Obispo, Cal., told me that he once saw a large number of large dark-colored hawks flying about over the edge of a prairie fire near Chico, in the Sacramento Valley. The air was full of grasshoppers driven out of the grass by the fire, and the hawks were catching and feeding upon them.

"Mr. T. S. Palmer, of Berkeley, Cal., has kindly furnished me with the following interesting communication on a flock of hawks observed by him at Pomona, Cal.: 'While spending the summer of 1887 at Pomona, Los Angeles County, Cal., I was much interested in a "flock" of hawks which remained in the vicinity during the month of August. The fact of their congregating in such numbers may be attributed to two causes: (1) Exceptional abundance of food in a particular spot; and (2) the fact that most of the birds were buteos (*B. swainsoni* predominating) which were migrating slowly southward.

" 'Their favorite resort was a sandy spot a mile east of the town, well out in the middle of the valley and quite a distance from the neighboring mountains. A single irrigating ditch supplied the only water to be had, and to it all the birds in the vicinity were accustomed to resort to drink. Rocky and dry as the spot was, it was sparsely wooded with sycamores and live oaks, and overgrown with white sage, cacti, elderberry bushes, etc. About the first of the month the hawks became common, and although at times scarcely any could be seen, a day or two after they would be present in greater numbers than ever before. On the 22d of August I succeeded in getting quite close to the flocks, and counted fourteen hawks circling about together, much in the manner of turkey buzzards, and not more than 50 or 75 yards from the ground. Nearly all seemed to be young birds, chiefly *Buteo b. calurus* and *Buteo swainsoni*, although there were several which I was unable to identify. All were intently engaged in hunting, and I have little doubt that they were feeding on grasshoppers.

"'During the month I secured but two specimens. The first taken on the 4th of August, and proved to be a female *Buteo swainsoni* in very dark plumage. Upon dissection the gizzard was found to be tightly packed with grasshoppers, and the bird had no doubt gorged herself, for when I approached the tree in which she was sitting she made no attempt to fly even when I was almost under her. My second specimen, a typical male *Buteo swainsoni*, was taken on the morning of August 31. Both the gizzard and œsophagus were filled with grasshoppers, and out of curiosity I undertook to ascertain their number. I found 110 pairs of the large hind legs, while an assistant counted 133 heads. It is safe to say that this hawk had captured 125 grasshoppers before 9 A. M. If this can be considered as the average number killed per day by each bird, the total number killed by the flock during their stay in the vicinity must have been something incredible.

"'About the 1st of September the hawks disappeared, and although I visited the place several times during December and January as well as during the summer of 1888, I never saw more than two or three at one time circling about in search of food.'"

Mr. A. S. Bennet, writing to the U. S. Department of Agriculture from Lay, Colo., states that on July 10, 1889, he saw flocks of large hawks, some of which were circling near the ground, while others were perched on it. The mass contained at least 500 individuals, and were feeding upon a species of cricket (*Anabrus purpurascens*), which covered over fully 4 acres of surface. A specimen shot for identification contained six of these insects in its stomach. At the report of the rifle the flocks left the vicinity, but in a short time returned to resume their feast.

From the above testimony it will be seen that Swainson's Hawk, although one of the larger species, is a most beneficial bird, as it destroys immense numbers of noxious mammals and insects and rarely touches poultry or other birds. The services thus rendered should gain for it the good will and protection of all fair-minded farmers and sportsmen, and not the short-sighted prejudice and enmity too commonly shown by these classes of men.

Its breeding range is nearly, if not quite, coincident with its distribution. The situation of the nest is variable. Sometimes it is placed in the tops of large cottonwoods bordering streams; at other times, a few feet from the surface in low trees or bushes on the prairie, while in still other cases it is built on the ground, at the top of some bank or shelf on cliff. The nest is large and slovenly placed together, and in some instances is nothing more than a platform of sticks of various sizes. Usually the nests placed on the ground are less bulky than those in the trees and shrubbery. The cavity is shallow and contains a lining of dry sticks, green leaves, corn husks, or, in the far North, the hair or fur of animals. In some cases, like other Hawks, it occupies the deserted nest of some other bird. The usual number of eggs in a

set is two, though three, and occasionally four or five are found. In Texas it commences nest-building in March, while in the northern United States it is the last of April before it begins, and the first of June before the young appear.

By preference it frequents the timber in the vicinity of streams, though often it is found far out on the prairie, where its only perch is the earth mound of some mammal, or some other slightly elevated knoll. In the fall this species congregates in large flocks, which often number several hundred individuals, and in certain localities where food is abundant they remain together. When the bird first starts from the ground the flight is heavy and clumsy, but in a few moments it becomes easy and graceful and may be long protracted. At times the flocks or even individuals will mount high in air and circle for hours, seemingly for no other purpose than amusement.

When captured young it makes a very interesting pet and soon becomes tame, as the following, from the pen of Mr. Robert Ridgway, testifies: "At our camp in Parley Park we reared four young birds of this species, which were taken from their nests while in the downy state. As they grew up under our care they became very pleasing pets, being exceedingly docile, and much attached to those who fed them. When sufficiently old to use their wings they showed no disposition to leave, although they were allowed full liberty all the while; and though they made frequent tours of inspection over the neighboring meadows, and occasional foraging excursions among the flocks of Blackbirds (*Scolecophagus cyanocephalus*) which frequented the vicinity, they seldom went far away, and always returned after a short absence. They were fed principally upon bits of fresh beef and mutton, varied occasionally by the carcasses of birds we had skinned. Their chief amusement about camp consisted in chasing grasshoppers over the ground, which they pursued by leaping after them, with the wings extended; but when not engaged in this occupation they usually perched quietly upon the fence near by or upon the tents." (U. S. Geol. Explor. of the Fortieth Parallel, King, vol. IV, 1877, p. 587.)

DESCRIPTION.

Only three outer wing feathers, with inner web distinctly cut out. Tail grayish brown, sometimes with a hoary tinge, crossed by a number of narrow dusky bands, which grow less distinct towards base. Above, grayish brown; forehead, chin, and throat, white; upper part of breast, plain rufous, cinnamon, or grayish brown; rest of lower parts, buffy white, sometimes unspotted, but usually more or less barred or spotted with whitish. From the above there are all phases of plumage to a uniform sooty brown.

Length: 19.50 to 22 inches (495 to 559^{mm}); extent, 48 to 56 inches (1220 to 1423^{mm}); wing, 14.50 to 17.25 inches (368 to 438^{mm}); tail, 8 to 10 inches (203 to 254^{mm}).

Div. Ornithology

HAWK
HAWK

Table showing the results of examinations of eighteen stomachs of Swainson's Hawk (Buteo swainsoni).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Cedar County, Nebr.	Aug., 1867			Gopher	68 locusts.
Do	do			do	61 locusts.
Dakota County, Nebr.	July, 1868			Rabbit	58 insects.
Sarpy County, Nebr.	Sept., 1872			Gopher; mouse	65 insects.
Salt Lake City, Utah.	May 31, 1869				Grasshoppers.
San Francisco Mountain, Arizona.	Aug. 29, 1889				Do.
Camp Verde, Ariz.	July 31, 1884			Arizona rabbit	
Do	Aug. 13, 1884			do	
Do	do				Empty.
Do	Aug. 16, 1884				Do.
Do	do				Do.
Do	July 18, 1885				Lizards.
Do	May 1, 1886				Large lizard, horned toads.
Do	Sept. 10, 1886				Grasshoppers, beetles, and frogs.
Do	May 5, 1888				Frog.
Do	May 15, 1888				Large lizards.
Birch Creek, Idaho	Aug. 4, 1890			Short-tailed spermophile.	
Walker Basin, Cal.	July 15, 1891				50 grasshoppers.

SUMMARY.—Of 18 stomachs examined, 7 contained small mammals; 8, insects; 3, reptiles; 3, batrachians, and 3 were empty.

COOPER'S BUZZARD.

Buteo cooperi.

The type specimen of this hawk was taken near Mountain View, in the Santa Clara Valley, California, by Dr. Cooper, in November, 1855, and remains unique to this day. Absolutely nothing is known of its life history, and hence no positive information can be given of its food habits. Its size and general make-up prove it to belong to the class of heavy-moving hawks, and it is probable that its food and habits conform in general to theirs.

BROAD-WINGED HAWK.

Buteo latissimus.

[Plate 10—Adult.]

The Broad-winged Hawk inhabits eastern North America from New Brunswick and the Saskatchewan River, ranging south through the United States, east of the Great Plains, to Middle America, West Indies, and northern South America. It migrates in September and October from the region north of latitude 40° and winters from this point southward. In March and early April it again passes north, often in considerable flocks. It breeds throughout the eastern United States as far north as the limit of its range.

The food of this Hawk consists principally of insects, small mammals, reptiles, and batrachians, and occasionally of young or disabled birds. A specimen secured by the writer in May, just after a shower, was gorged with large earth worms. In the spring, when toads frequent

ponds to spawn, it devours large numbers of them, and later in the season it is a not uncommon occurrence to see an individual with a frog or snake dangling from its talons.

Mr. Maynard mentions seeing one of these birds attack and kill an adult brown thrush. The writer considers this a very exceptionable event, for from his own observations and those of other ornithologists, it is an undeniable fact that the Broad-winged Hawk rarely attacks birds, and when it does they are generally young just from the nest. In the woods the small birds pay little attention to this Hawk and show no fear in its presence. Mr. James W. Banks found the remains of three unfledged thrushes in the stomach of one killed near St. John, New Brunswick. (Auk, vol. I, 1884, p. 96.)

Among mammals the smaller squirrels and wood mice are most frequently taken, though field mice and shrews also are found in the stomach contents.

During August and September a considerable portion of the food consists of the larvæ of certain large moths which are common at this season, notably those of the elm sphinx (*Ceratomia amyntor*), of the Cecropian moth (*Attacus cecropia*), and of the Polyphemus moth (*Telea polyphemus*), and it is the exception not to find their remains in the stomachs examined. Grasshoppers, crickets, and beetles are also greedily devoured.

The following quotations bear on the subject of this hawk's food:

Audubon says: "In the stomach of this bird I found wood frogs, portions of small snakes, together with feathers, and the hair of several small specimens of quadrupeds." (Ornith. Biography, vol. I, p. 463.)

Mr. J. W. Preston says: "Their food consists of small squirrels, frogs, and, in fact, any small quarry easily captured. Never have I known them to molest the poultry." (Ornith. and Oologist, vol. XIII, 1888, p. 20.)

Mr. J. G. Wells, speaking of the bird in the West Indies, says: "Numerous; feeds on lizards, rats, snakes, young birds, etc., and occasionally makes a raid on the poultry yard." (Proc. U. S. Nat. Mus., vol. IX, 1886, p. 622.)

Dr. F. W. Langdon says: "The stomach of a specimen of this hawk taken at Madisonville in April, 1877, contained the greater part of the skeleton and hair of a small wood mouse (*Arvicola austerus*), a lizard (*Eumeces*) about 6 inches long, and ten or twelve small beetles, with numerous elytra of the same." (Journ. Cincinnati Soc. Nat. Hist., vol. I, p. 116.)

Dr. B. H. Warren gives the following: "In twelve specimens examined by myself, four revealed mice; three, small birds; four, frogs; one, killed the 22d of May, 1882, was gorged with crayfish, with which were traces of coleopterous insects." (Birds of Pennsylvania, 1888, p. 91.)

The only act of the Broad-winged Hawk which seems injurious to agriculture is the killing of toads and small snakes; the former of which are exclusively insect-eaters, the latter very largely so. In one respect

its enormous value ranks above all other birds, and that is in the destruction of immense numbers of injurious larvæ of large moths, which most birds are either unable or disinclined to cope with. The good service it does should insure it the protection extended to the other *Buteos*.

The following species of mammals were positively identified among the stomach contents:

Sciurus hudsonicus.
Arvicola riparius.
Arvicola pinetorum.
Scalops aquaticus.
Blarina brevicauda.
Blarina b. carolinensis.
Tamias striatus.
Lepus sylvaticus.
Mus decumanus.

The nest, which is placed in a fork of either an evergreen or deciduous tree, usually is not over 25 feet from the ground, though occasionally it is situated in the tops of the highest trees. Sometimes this hawk appropriates the deserted nests of some other bird, notably that of the crow, or even uses for a foundation the outside canopy of the squirrel. The nest, which averages a little larger than that of the crow, is composed of dead sticks and lined with strips of bark, or with dry or green leaves. The eggs, of which the complement is usually two or three, are deposited from the middle to the latter part of May, consequently this species is among the latest of the hawks to breed. The male assists in incubating the eggs as well as in the duties pertaining to bringing up the young.

Of all our Hawks this species seems to be the most unsuspicious, often allowing a person to approach within a few yards of it, and when started flies but a short distance before it alights again. During the early summer the Broad-winged Hawk often may be seen sitting for hours on the dead top of some high tree. At other times it is found on the smaller trees in the deep woods, along streams, or on the ground, where its food is more often procured. Although sluggish and unusually heavy in its flight, it is capable of rapid motion and sometimes soars high in the air. One of its notes resembles quite closely that of the wood pewee.

DESCRIPTION.

Wing less than 13.50 inches (342^{mm}). Middle toe shorter than naked portion of leg in front.

Adult.—Above dusky brownish, darker on back; below brownish, dull rufous, or rusty, more or less broken by white transverse spotting; lower belly white, barred with dull rufous; tail blackish, crossed by two to four bands of gray or brownish white.

Immature.—Entire underparts dull white or buffy, with longitudinal brown or dusky streaks on breast and sides; tail grayish brown, crossed by five to seven narrow bands of dusky.

Length: 13.25 to 18 inches (336 to 457^{mm}); extent, 33 to 36 inches (838 to 915^{mm}); wing, 9.75 to 11.40 inches (247 to 290^{mm}); tail, 6.50 to 8 inches (165 to 203^{mm}).

Table showing the results of examinations of 65 stomachs of the Broad-winged Hawk (Buteo latissimus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sing Sing, N. Y	Sept. 19, 1885			Chipmunk	Crickets, grasshoppers.
Middle Haddam, Conn.	Sept. 4, 1885				Toad.
London, Canada	Sept. 22, 1883				Toad, large number larvæ.
Lockport, N. Y	Apr. 27, 1886			Meadow mouse	Snake, 2 beetles.
Brooklyn, Ohio	May 10, 1886			Chipmunk, shrew.	
Washington, D. C	June 5, 1887		3 oven birds	2 shrews	
Syracuse, N. Y	Apr. 30, 1887				Toad.
Roan Mountain, N. C	Aug. 10, 1887			Mouse	
Long Island City, N. Y.	Sept. 23, 1887				Garter snake, toad, larvæ, beetles.
Do	Sept. 24, 1887				Larva.
Do	do				Quantity of crickets.
Sing Sing, N. Y	Sept. 21, 1881				8 elm sphinx larvæ.
Do	Sept. 23, 1881				Elm sphinx larvæ.
Lake George, N. Y	Aug. 2, 1882				Garter snake.
Sing Sing, N. Y	May 8, 1885				Quantity of earth worms.
Troy, N. Y	Sept. 19, 1885				Tree-frog, grasshoppers.
Sandy Spring, Md	May 10, 1887			Chipmunk, shrew.	
Do	Sept. 1, 1887				Grasshopper.
Chester County, Pa	May 28, 1878				Frog.
Elmira, N. Y	June 27, 1885			Large rat, field mouse.	
Do	Apr. 9, 1886			Weasel	
Do	July 3, 1887		Small bird		
Sandy Spring, Md	Apr. 28, 1888			Pine mouse	
Do	May 29, 1888				Toad.
Do	June 3, 1888			4 shrews	
Buckhannon, W. Va	Aug. 12, 1888				Water snake, 2 cicadas, 1 moth, 1 lepidopterous larva, 1 beetle, 1 spider.
Berwyn, Pa	May 11, 1888				Beetles.
Virginia	Sept. 29, 1889				11 lepidopterous larvæ, 1 white grub, 1 beetle, 1 katy-did, 1 stone cricket.
West Goshen, Pa	Sept. 22, 1886				Crawfish.
Alder Creek, N. Y	Aug. 6, 1886			Meadow mouse	
Germantown, Pa	Apr. 30, 1885				Garter snake.
Utica, N. Y	Jan. 1885			2 meadow mice	2 frogs, 2 beetles.
Brookville, Ind	Apr. 19, 1887				Empty.
Decatur County, Ind	Apr. 22, 1887			2 meadow mice, 1 shrew.	1 garter snake, crawfish.
Raleigh, N. C	May 23, 1888			Mouse	
Do	do				Crawfish.
Rensselaer County, N. Y.	Sept. 12, 1887				Empty.
Do	Sept. 13, 1887			Mouse	Frogs, grasshoppers, crickets.
Berkshire County, Mass.	Sept. 14, 1889			Mouse	5 grasshoppers, larvæ, cave cricket, dung beetle.
Huntington, N. Y	Jan. 20, 1890				Empty.
Sandy Spring, Md	July 22, 1890				Empty.
Do	do				2 May beetles.
Do	Aug. 1, 1890				Garter snake, 3 May beetles, 11 larvæ.
Highland Falls, N. Y	May 4, 1874			Hair of mammal	Salamanders, beetles, other insects.
Do	May 3, 1876			Mice, red squirrel	
Do	May 5, 1876				Empty.
Rockland County, N. Y	Aug. 17, 1876				Do.
Highland Falls, N. Y	May 25, 1877				17-year locusts.

Table showing the results of examinations of 65 stomachs of the Broad-winged Hawk (Buteo latissimus)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Highland Falls, N. Y.	Aug. 23, 1879				Salamander.
Do	Apr. 25, 1880			Meadow mice, mole.	Small beetles.
Hudson River, N. Y.	Sept. 11, 1880			Short-tailed shrew, meadow mice.	
Highland Falls, N. Y.	....do				Beetles.
Do	Apr. 30, 1883				Empty.
Fort Snelling, Minn	May 2, 1889				Red-bellied snake, dragonfly.
Spring Valley, Penn.	Sept. 2, 1890				Salamander, tree frog, crawfish, earth worm, 6 katy-dids, 3 rock crickets, cricket, cicada, squash beetle, 2 other beetles, 19 larvæ.
Do	....do				Beetle, cicada, 4 rock crickets, 23 katy-dids, 44 larvæ.
Portland, Conn.	May 22, 1890			4 short-tailed shrews.	
Do	Sept. 26, 1890				1 toad, 6 crickets, grasshopper, beetle.
Morristown, N. J	....do				3 katy-dids, 3 grasshoppers, 2 larvæ.
Sandy Spring, Md	Apr. 26, 1891			Meadow mouse.	Garter snake.
Do	Nov. 26, 1891			1 short-tailed shrew.	2 caterpillars.
Farmington, Conn.	Sept. 25, 1889				1 katy-did, 1 spider, 1 sphinx larva.
Cobham, Va	May 13, 1892				1 blue-tailed lizard, 1 beetle.
Do	....do			Young rabbit, 2 short-tailed shrews.	1 blue-tailed lizard.
Sandy Spring, Md.	Aug. 20, 1892				34 grasshoppers, 6 cicadas, 1 large walnut moth larva, polyphemus larva.

SUMMARY.—Of 65 stomachs examined, 2 contained small birds; 15, mice; 13, other mammals; 11, reptiles; 13, batrachians; 39, insects; 2, earth worms; 4, crawfish; and 7 were empty.

SHORT-TAILED HAWK.

Buteo brachyurus.

The Short-tailed Hawk, or Little Black Hawk as it is designated in the melanistic phase of plumage, inhabits tropical America, except the West Indies, ranging northward to northern Mexico and Florida. Along the gulf coast of the latter State it is of rare but regular occurrence.

In the spring of 1889 Mr. C. J. Pennock found a pair nesting at St. Marks, Fla., and secured the female, together with one egg. The nest was situated in a pine tree, and consisted of an old nest of a heron remodeled by the addition of a lining of green cypress twigs. The cry which the bird emitted as it circled near the tree resembled somewhat

that of the Red-shouldered Hawk. (Auk, VII, 1890, 56.) Mr. W. E. D. Scott secured a pair at Tarpon Springs, Fla., just as they were starting to build a nest. (Auk, VI, 1889, 243.)

There is very little on record regarding the food, habits or, for that matter, the life history in general of this Hawk, which so seldom crosses our southern border. It is not improbable that it resembles the Broad-winged Hawk in habits as well as in the character of its food, though unlike that bird, it is stated to be wary and difficult of approach. In any event, its rarity within our territory precludes its having much economic interest or importance.

DESCRIPTION.

Wing less than 13.50 inches (342^{mm}). Middle toe longer than bare portion of leg in front. Forehead, anterior space in front of the eyes, cheek, and lower parts, pure white; side of chest with patch of rufous or cinnamon. A phase occurs in which the plumage is a uniform sooty-brown or black.

Length: 16 inches, (406^{mm}); wing, 10.50 to 13.10 inches (267 to 332^{mm}); tail, 6 to 8 inches (152 to 203^{mm}).

MEXICAN BLACK HAWK.

Urubitinga anthracina.

The Mexican Black Hawk inhabits tropical America in general, ranging northward as far as central Arizona (Verde Valley) and southern Texas. It is so limited in its distribution within our territory as to warrant brief mention only.

The food of this Hawk consists mostly of the lower forms of vertebrate life and, rarely, of birds. Mr. C. C. Nutting states that it feeds largely upon reptiles. (Proc. U. S. Nat. Mus., vol. V, 1882, p. 404.) Dr. E. A. Mearns, speaking of it in Arizona says: "Occasionally one was seen eating fish upon the sandy margin of the river." (Auk, vol. III, 1886, p. 72.) Mr. Robert Ridgway mentions a specimen which was shot while feeding on a curassow (*Crax*). (Proc. U. S. Nat. Mus., vol. VIII, 1885, p. 581.)

Mr. F. E. Sumichrast, speaking of their food in southwestern Mexico, says: "The kind of food is varied; being naturally voracious, they despise no living prey, and I have taken our of their stomachs small quadrupeds, young birds, reptiles, crustacea, and insects. They are fond of fish, and on the borders of shallow brooks they easily catch the smaller kinds. (Bulletin U. S. Nat. Mus. No. 4., 1876, p. 42.)

Dr. E. A. Mearns states that it migrates from the vicinity of Camp Verde in fall and does not appear again until spring. It breeds to the northern limit of its range. The eggs, usually two in number, are deposited about the first of May, and by the middle of June the young are half grown. The nest is placed in some large cottonwood or other

tree near the border of a stream, and is often occupied for several successive seasons. It is a bulky structure, composed of sticks and herbage, lined with dry leaves. This Hawk is most often found among the thick foliage near water courses, where it is observed with difficulty before taking wing, and then is seen for a moment only as it passes through the screen of leaves and branches. Its flight is swift and powerful.

DESCRIPTION.

Uniform black, with a chalky cast in certain lights; tail white at base and tip, and crossed about the middle with a broad white zone; ends of feathers covering base of tail tipped with white; outer wing feathers mottled with rusty.

Length: 21 to 23 inches (533 to 584^{mm}); wing, 13 to 16 inches (330 to 405^{mm}); tail, 7.90 to 11 inches (200 to 280^{mm}).

Table showing the results of examinations of 6 stomachs of the Mexican Black Hawk (Urubitinga anthracina).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Camp Verde, Ariz	Sept. 26, 1884				Frogs.
Fossil Creek, Ariz	June 19, 1885				Indeterminate matter.
Do	do				Do.
Yavapai County, Ariz.	June 30, 1886				Fishes and frogs.
Do	May 20, 1887				Snake.
Do	May 21, 1887				Frogs and fish.

SUMMARY.—Of 6 stomachs examined, 3 contained batrachians; 2, fish; 1, reptile, and 2 indeterminate matter.

MEXICAN GOSHAWK.

Asturina plagiata.

The Mexican Goshawk is distributed through the country from the Isthmus of Panama northward to the southern parts of Arizona and New Mexico. It is a common summer resident in the vicinity of Tucson, among the mesquit groves, but leaves for its winter home in October.

This Hawk feeds on small reptiles, ground squirrels, mice, insects, and birds. Capt. Charles E. Bendire, speaking of the food, says: "It is stated that this hawk feeds principally on lizards, but although the latter are exceedingly plentiful throughout southern Arizona, I am satisfied that small birds form no inconsiderable portion of its food." (Ornithologist and Oologist, vol. VI, 1882, p. 88.) Mr. William Brewster, speaking of the food of birds captured in the vicinity of Tucson, says: "The stomachs of the specimens examined contained lizards, small squirrels, fish scales, the wing covers of beetles, and unrecognizable fur and bones of small rodents." (Bull. Nutt. Ornith. Club, vol. VIII, 1883, p. 31.)

In the vicinity of Tucson the eggs are deposited about the middle of May, though nests in which the eggs were only partially incubated have been found as late as June 15. The usual complement of eggs is two, though three are not uncommon. The nest is placed in the tops of high trees, often 50 to 75 feet from the ground. According to Capt. Charles E. Bendire, it is composed of the fresh twigs of the cottonwood, with some of the leaves attached. He has observed the birds breaking off the branches with their talons as they pass rapidly by the tree. In some cases the lining of the nest is composed of dry leaves of the cottonwood, while in others the strips of bark are also used.

This hawk frequents the more open groves and the borders of timber, and usually is not shy or difficult to approach. The flight is swift and falcon-like. Capt. Bendire states that its note resembles very closely that of the long-billed curlew and at first he mistook it for that of the latter bird.

The Mexican Goshawk, like a number of other tropical species which cross the southern border, is of very little economic importance in the present connection on account of its limited distribution in our territory.

DESCRIPTION.

Above deep ash gray; top of head and back of neck with five blackish shaft streaks; tail black, tipped with white, and crossed by two or three narrow bands of white; feathers covering base of tail white; below white, very regularly barred with ashy, the stripes being farther apart on flanks and belly.

Length: 16 to 18 inches (406 to 457^{mm}); wing, 9.50 to 11.70 inches (242 to 297^{mm}); tail, 6.70 to 8.20 inches (170 to 208^{mm}).

ROUGH-LEGGED HAWK.

Archibuteo lagopus sancti-johannis.

[Plate 11—Adult.]

The Rough-legged Hawk inhabits, during the different portions of the year, the greater part of North America north of Mexico, but in summer is found north of the United States only. In the West it extends far south in winter, occurring not uncommonly in suitable localities in Kansas, New Mexico, Arizona, and southern California. In the east its winter range is more restricted, and the species may be considered rare or of casual occurrence south of the Potomac River. The limit of its northern range in winter depends much more upon the presence or absence of snow than upon temperature. It retreats and advances from one feeding ground to another as the snow comes and goes, keeping just south of the snow belt. In average winters it is found through southern New England, southern New York, Illinois,

AMERICAN ROUGH LEGGED HAWK

Missouri, and Nebraska, and on the Pacific coast as far north as Washington. Generally it is common as late as November and as early as April in the southern portions of the northern tier of States.

The Rough-leg is one of the most nocturnal of our hawks, and may be seen in the fading twilight watching from some low perch, or beating with measured, noiseless flight, over its hunting ground. It follows two very different methods in securing its food, one by sitting on some stub or low tree and watching the ground for the appearance of its prey, as the Red-tail does; the other by beating back and forth just above the tops of the grass or bushes, and dropping upon its victim, after the manner of the Marsh Hawk. Its food consists principally, if not almost exclusively, of the smaller rodents, and most prominent among these are the arvicoline mice and lemmings. As is well known, the meadow mice (*Arvicolæ*) are widely distributed over the north temperate zone, and often occur in immense numbers, overrunning certain sections of country, and doing irreparable damage to crops as well as to fruit and ornamental trees. Repeatedly young orchards, consisting of hundreds of trees, and representing great money value, have been totally destroyed by these pests. The damage is done in winter, under the snow, where the mice eat the bark from the trees, often completely girdling them and causing their death. Usually meadow mice are fairly common if not abundant over a large part of the meadow and marsh lands of the central and northern United States and temperate Canada. To show how important meadow mice are to the Rough-leg as an article of food, it may be stated in general terms that the southern limit of its wandering in winter is nearly coincident with the southern boundary of the region inhabited by meadow mice. In the north lemmings are abundant over the country in which the Rough-leg makes its summer home, and furnish a never-failing supply of food for old and young.

The following statements indicate to what extent the Rough-leg feeds on meadow mice: Mr. E. O. Damon, of Northampton, Mass., informs the writer that he has killed hundreds of these hawks on the low meadows bordering the Connecticut River, and of the many stomachs he examined all contained the remains of meadow mice. He further states that he never found even a frog in its stomach or saw it attack anything larger than a rat or meadow mouse. Dr. Michener (in U. S. Agr. Rept., 1863, p. 291) says of the Rough-leg: "The number of meadow mice which this species destroys ought, one would think, to insure it the protection of every husbandman." Dr. J. C. Merrill states that the stomachs of those killed at Fort Klamath, Oregon, usually contained field mice. (Auk, vol. v, p. 145.) Mr. A. Hall, writing of this hawk in Nebraska, says: "This species is very abundant in winter, and subsists entirely upon mice, frogs, and small rodents. It seldom if ever preys upon birds." (Forest and Stream, vol. xx, May 10, 1883, p. 284.)

Mr. H. W. Henshaw gives the following relative to the food of this species: "Utah Lake and the surrounding marshes attract multitudes of water fowl; and this undoubtedly explains in part the abundance of hawks at this season, since wounded and disabled ducks must form no inconsiderable part of their food. In its manner of hunting it much resembles the foregoing species [Squirrel Hawk], and it subsists to a great extent upon mice, which are very numerous in the rushes. In the stomachs of every individual captured [eleven in number] were found the remains of these little animals." (Explor. West of the 100th Merid., Wheeler, vol. v, 1875, p. 426.)

The examination of such a considerable number of specimens from a locality in which multitudes of ducks occur, and the finding of nothing but the remains of mice is quite conclusive evidence that the former is not their favorite food. Recently Mr. Henshaw informed the writer that the above statement relative to this hawk feeding on water fowl was based on reports of gunners, which he now believes to be incorrect. Besides lemmings and meadow mice the Rough-leg feeds at times quite extensively on other species of mice, ground squirrels, moles, shrews, and even rabbits. Capt. Bendire states that while it remains at Camp Harney, Oregon, its principal food consists of cotton-tail rabbits.

Among the earlier writers, Wilson gives the following about its food: "This handsome species notwithstanding its formidable size and appearance, spends the chief part of the winter among our low swamps and meadows, watching for mice, frogs, lame ducks, and other inglorious game." Audubon says: "It feeds principally on moles, mice, and other small quadrupeds, and never attacks ducks on the wing, although now and then it pursues a wounded one." Nuttall gives mice, moles, and frogs as its food and quotes Pennant as authority for the statement that it feeds on ducks.

We find very little information as to whether the Rough-leg feeds extensively on insects, or of the kinds which it devours. Prof. Samuel Aughey found the remains of seventy insects besides other food in the stomach of a specimen shot in Nebraska in September. It is presumable that like the *Buteos* it at times feeds extensively on grasshoppers, crickets, and beetles. It is credited with feeding on snakes, lizards, frogs, and toads, though the writer has never found the remains of any of these animals in the stomachs examined, and finds but a few general remarks on the subject in the books.

Although one of the largest hawks, the Rough-leg is undoubtedly one of the most harmless, so far as molesting poultry and game is concerned. Pennant is chiefly accountable for any prejudice that may be felt against the bird, for he asserted that it fed largely on ducks, and remarked that it "sits on a rock and watching their rising, when it instantly strikes at them." This statement has been copied by various authors, especially the earlier ones, until now there are many people who really believe it. The writer has yet to meet anyone who has

seen it attack water fowl, or in fact any other bird. Among those questioned on the subject are a number of eminent ornithologists, some of whom have published the statement that the Rough-leg feeds on wounded ducks. The error arose from their taking information second-hand from gunners who probably mistook either the Duck Hawk or Prairie Falcon for the bird under consideration When hard pressed by hunger it may feed on dead water fowl as well as the carcasses of other animals.

Those Hawks that remain farthest north in winter are more often forced by circumstances to feed on refuse. Maynard says that in Massachusetts they feed upon fish and the dead animals cast up by the sea, and Mr. Vernon Bailey, writing from Elk River, Minnesota, says: "A few years ago, probably in 1883, I was trapping for muskrats and minks late in the fall. As the place was over a mile from home, and I was catching a good many rats, I skinned them and left the carcasses where caught. Soon I noticed that these were often eaten or gone. Rough-legged Hawks were unusually numerous that fall, and stayed nearly all winter. One morning I came suddenly to the top of a hill and saw a hawk fly away from a half-eaten rat on the other side. It was promptly shot, and proved to be a fine dark Rough-leg. This was the only time that I caught the hawk in the act, but from the manner in which the rats were eaten, the number of hawks present, and after snow came the tracks seen around the remains of the rats, I had no doubt that the hawks had eaten them."

The few specimens which have been secured in summer south of the northern boundary of the United States are those which have failed to migrate, presumably on account of disease or from inability or indisposition to make long flights after the receipt and healing of gunshot wounds. In all these cases the genitalia are undeveloped. The nest and eggs mentioned in the History of North American Birds as coming from Wiscasset, Me., near the mouth of the Kennebec River, if not an error in identification, is probably the only record of the breeding of this species in eastern United States. Dr. Warren informs the writer that the instance mentioned in his "Birds of Pennsylvania" of the Rough-leg breeding in Pennsylvania was a case of misidentification. Dr. G. S. Agersborg gives it as breeding once in southeastern Dakota (Auk, vol. II, p. 285), but does not inform us whether it was found nesting or merely that the presence of the bird in summer was taken as evidence.

It breeds sparingly in Labrador and the southern portions of Canada west of Manitoba. In the vicinity of Winnipeg, Seton gives it as a migrant only. (Auk, vol. III, 1886, p. 154.) Farther north, even far within the Arctic circle, it is an abundant breeder. Although common in the Hudson Bay and Anderson River regions in northern Alaska, the Old World form seems to replace it not only on the seacoast, but along the entire length of the Yukon.

The nesting site is more or less varied, most of the nests being

placed in trees, while others are situated on rocky ledges or on top of shaly cliffs. Out of the fifty-eight nests found by Mr. MacFarlane forty-six were placed in trees, while the remaining twelve were built along the edge of steep cliffs. Those in the former site were found usually in pines [spruces] and were built in a crotch near the top. The nest is formed of dry sticks and small twigs, lined with fine grass and feathers. It is stated that those built on cliffs usually contain more soft material for lining, giving them a compact appearance. The eggs in a set vary from three to five in number. They are deposited as early as the middle of May, and in the higher latitudes fresh eggs have been secured as late as the last of June.

The Rough-legged Hawk is one of the largest, as well as one of the most striking of American Hawks. It is mild and gentle in disposition, and even when adult may be tamed in the course of a few days so that it will take food from the hand and allow its head and back to be stroked. When caged with other species of hawks it does not as a rule fight for the food, but waits until the others have finished, before it begins to eat. The most wonderful exception to this, however, and one hard to credit, is related by Mr. E. W. Nelson, as follows: "A friend of the writer's, living on a farm in Northeastern Illinois amused himself one spring by trapping various birds of prey as they passed north, using his empty corncrib as a bird-house. Into this, in rapid succession, were introduced Red-tailed, Sharp-shinned, Cooper's, Broad-winged, and Rough-legged Hawks, with a single Horned Owl. As might be expected, the family was by no means a happy one, and as my friend failed to provide a sufficient supply of food, the owl made use of his fellow prisoners, and in a very few days the owl and a black Rough-legged Hawk—the handsomest specimen I ever saw—were the only occupants of the crib. The next act in the tragedy closed with the Rough-legged Hawk perching quietly in his usual corner, while the badly used-up form of *Bubo* lay among the bones of its victims." (Report Nat. Hist. Collections in Alaska, 1887 p. 143.)

The flight of the Rough-leg is seldom rapid and often appears labored and when on the wing, this hawk resembles the Osprey more than any other bird of prey.

DESCRIPTION.

Legs densely feathered in front and on sides down to base of toes. Width of bill at corners of mouth 1.35 to 1.45 inches (33 to 36^{mm}). Head and neck whitish, streaked with dusky. Above, irregularly varied with white, grayish, dusky, or rusty; base of tail and feathers covering its upper surface, white; broad band near end of tail, grayish or dusky. Below, whitish, usually with a band of dusky across front. Specimens are sometimes nearly uniform black.

Length: 19.50 to 23.50 inches (495 to 597^{mm}); extent, 50 to 54 inches (1270 to 1370^{mm}); wing, 15.75 to 18 inches (400 to 457^{mm}); tail, 9 to 11 inches (228 to 280^{mm}).

FERRUGINOUS ROUGH LEG

Table showing the results of examinations of 49 stomachs of the Rough-legged Hawk (Archibuteo lagopus sancti-johannis).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester County, Pa...	Dec. 9, 1886	.....	.....	Small short-tailed shrew.	
Do	Feb., 1887	.....	.....	Meadow mouse.	
Do	Jan. 28, 1879	.....	.....	Mice.....	
Do	....do	.....	.....	....do	
Do	Dec. 27, 1878	.....	.....	....do	
Do	Apr., 1876	.....	.....	....do	
Do	Mar. 20, 1880	.....	.....	....do	
Beatrice, Nebr	Sept., 1872	.....	.....	Gopher.....	Lizard; 70 insects
Elmira, N. Y	Nov. 5, 1887	.....	.....	Rabbit.....	
Do	Jan. 3, 1888	.....	.....	Weasel	
Sandy Spring, Md.....	Mar. 17, 1888	.....	.....	2 meadow mice..	
South Windsor, Conn..	Mar. 29, 1887	.....	.....	Meadow mouse.	
Portland, Conn.....	Mar. 30, 1887	.....	.....	6 meadow mice..	
Northampton, Mass ...	Nov. 30, 1887	.....	.....	5 meadow mice..	
Do	Dec. 2, 1887	.....	.....	Meadow mouse, house mouse.	
Do	Dec. 14, 1887	.....	.....	6 meadow mice..	
Do	Dec. 20, 1887	.....	.....	3 house mice....	
Do	Nov. 26, 1886	.....	.....	Meadow mice...	
Do	Nov. 27, 1886	.....	.....	....do	
Do	Dec., 1886	.....	.....	....do	
Do	Feb. 23, 1887	.....	.....	2 meadow mice..	
Do	Feb. 16, 1887	.....	.....	7 meadow mice..	
Do	Apr. 9, 1888	.....	.....	....do	
Do	Apr. 14, 1888	.....	.....	8 meadow mice..	
Do	....do	.....	.....	2 meadow mice..	
Do	Apr. 15, 1888	.....	.....	.....	Empty.
Do	....do	.....	.....	2 meadow mice..	
Do	....do	.....	.....	3 meadow mice..	
Adams, Decatur County, Ind.	Jan. 15, 1887	.....	.....	3 white-footed mice.	
Tracy Station, Ind....	Feb. 12, 1887	.....	.....	.....	Do.
Do	....do	.....	.....	Rabbit.....	
Do	....do	.....	.....	.....	Do.
Springfield, Ind	Mar. 21, 1887	.....	.....	White-footed mouse.	
Decatur County, Ind ..	Mar. 22, 1887	.....	.....	3 mice	
Rensselaer County, N. Y.	Feb. 15, 1880	.....	.....	Meadow mice...	
Northampton, Mass ...	Apr. 1, 1887	.....	.....	Mice.....	
Cincinnati, Ohio	Jan. 27, 1885	.....	.....	4 meadow mice .	
Do	....do	.....	.....	Mice.....	
Amagansett, Long Island.	Feb. 24, 1884	.....	.....	Meadow mice...	
Suffolk County, N. Y ..	Nov. 22, 1884	.....	.....	4 meadow mice .	
Jackson County, Mo ..	Dec. 22, 1883	.....	.....	Meadow mice...	
Do	....do	.....	.....	....do	
Amagansett, N. Y	Mar. , 1886	.....	.....	Mice.....	
Albany County, N. Y..	Oct. 29, 1888	.....	.....	2 meadow mice .	
East Hartford, Conn ..	Feb. 9, 1887	.....	.....	Meadow mouse .	
Orange County, N. Y ..	Jan. 9, 1884	.....	.....	.....	Do.
Lancaster County, Pa .	Feb. 23, 1892	.....	.....	1 meadow mouse.	
Do	Mar. 8, 1892	.....	.....	2 meadow mice .	
Do	....do	.....	.....	4 meadow mice .	

SUMMARY.--Of 49 stomachs examined, 40 contained mice; 5, other mammals; 1, lizards; 1, insects; and 4 were empty.

FERRUGINOUS ROUGH-LEG.

Archibuteo ferrugineus.

[Plate 12—Adult.]

The Ferruginous Rough-leg, or Squirrel Hawk, inhabits the western United States ranging to the eastern border of the Great Plains, north to the Saskatchewan River, and south into Mexico. It migrates from the northern part of its range before the advent of cold weather. It

breeds regularly from Colorado, Kansas, and Nebraska northward; south of this region there seems to be no positive record of its nesting.

The food of this Hawk consists almost exclusively of small mammals and reptiles, and, like the Rough-leg, never attacks birds. Dr. J. G. Cooper, as quoted in History of North American Birds (vol. III, p. 303), says: "It rarely, if ever, attacks poultry, and limits its prey to wild animals, and is therefore a decided friend to the farmer."

Mr. H. W. Henshaw says of its food: "Their prey consists princi pally of the small mammals—mice and ground squirrels—to secure which they fly a few feet from the ground." (Explor. West of the 100th Merid., Wheeler, vol. v, 1875, p. 425.)

Dr. Coues gives the following: "In the stomachs of those examined I found the remains of burrowing pouched rats (*Thomomys fulvus*, Woodh.), the western wood mouse (*Hesperomys leucopus* var. *sonoriensis*), kangaroo-mice (*Dipodomys ordii*), and some *Arvicolæ* I could not identify. I was never before aware of the latter in this locality [Ft. Whipple, Ariz.], and would remark, in passing, how often small mammals, reptiles, and insects, which might long remain undetected, owing to their rarity or insignificance, are found in the stomachs of rapacious birds. * * * This bird is known as the 'California Squirrel Hawk' in some localities, but it is not to be inferred that they often capture the agile arboreal *Sciuri*. The name is gained from their feeding extensively, in California, upon the 'ground squirrels' (*Spermophilus beecheyi*), which abound in many parts of that State. The Hawks are almost always, too, observed in the vicinity of the settlements of the *Spermophili*, standing on the ground where there are no trees, or flying low over the surface, in either case on the alert to seize any unlucky animal that may venture too far from home." (Birds of the Northwest, 1874, p. 366.)

Thus it will be seen that this species is harmless and very beneficial and hence should be protected by all agriculturists throughout the country it inhabits.

The nest is usually built in a tree at no great distance above the ground, but when trees are not available it is placed on the shelves of some of the earth cliffs which abound in certain parts of the West. Like that of the other larger hawks, it is composed of good-sized sticks and coarse herbage of one kind or another, and is lined with softer material than the bulk of the structure is composed of. When such things existed on the plains, the ribs and smaller bones of the buffalo were used in the construction of the nest, often forming a large part of it. The eggs, which are usually three or four in number, are deposited early in May, and by the middle of July the young are ready to leave the nest.

The Squirrel Hawk is preëminently a bird of the prairie, and, unlike the common Rough-leg, shows little partiality to the vicinity of water, though in other respects it closely resembles the latter bird in habits. When this hawk is hunting its flight appears labored and heavy, but

GOLDEN EAGLE

Aquila chrysaetos

when circling high in the air its flight is graceful and resembles closely that of the Golden Eagle. In fact, in parts of the West it is known by the name Eagle.

DESCRIPTION.

Legs densely feathered in front and on sides down to base of toes. Width of bill at corners, 1.70 to 1.90 inches (42 to 48^{mm}). Upper parts, generally, and thighs rusty; the former streaked longitudinally and the latter transversely; tail white, washed with ashy gray or rusty; lower parts pure white.

Length: 22.50 to 25 inches (572 to 635^{mm}); extent, 54 to 56.50 inches (1370 to 1435^{mm}); wing, 15.90 to 18.80 inches (404 to 477^{mm}); tail, 9.50 to 11 inches (242 to 280^{mm}).

Table showing the results of an examination of 1 stomach of the Squirrel Hawk (Archibuteo ferrugineus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Camp Verde, Ariz.....	Dec. 21, 1886	.....	.....	Arizona rabbit..	

GOLDEN EAGLE.

Aquila chrysaëtos.

[Plate 13—Adult.]

The Golden Eagle inhabits the northern portions of the northern hemisphere ranging south in North America to southern California, Arizona, New Mexico, Texas, and Georgia. It seems to be nowhere a common species in the East, but it is much more numerous in the mountainous parts of the far West. It is confined chiefly to the mountains and more northern latitudes, where it breeds. It is able to endure intense cold, and sometimes remains far north in winter. In fact, its movements at that season are more in the form of wandering for food than regular migration to the south.

The food consists mainly of mammals and birds, of which spermophiles, rabbits, fawns, lambs, turkeys, grouse, water fowl and other large birds form the principal part, though offal and carrion are sometimes taken.

Audubon speaks of the food as follows: "Young fawns, raccoons, hares, wild turkeys and other large birds are their usual food, and they devour putrid flesh only when hard pressed." (Ornith. Biography, vol. II, p. 467.) In the north, Mr. MacFarlane states that they feed on ducks, mice, and other small animals, partridges, and the fawn of the reindeer. (Hist. North Am. Birds, vol. III, p. 318.)

Capt. Charles E. Bendire, speaking of them in Oregon, says: "They

are generally seen hunting in pairs in the early spring, chasing ducks, geese, and sage hens, and mostly successfully. I came within a few feet of one gorging itself on a yellow-footed marmot [*Arctomys*] it had just captured." (Proc. Bost. Soc. Nat. Hist., vol. XIX, 1877, p. 137.)

Dr. E. A. Mearns, U. S. Army, in a note on the Golden Eagle, says: "Several years ago a Golden Eagle was shot opposite those cliffs by a farmer at Cold Spring [New York] while in the act of destroying a goose belonging to the farmer." (Bull. Nutt. Ornith. Club, vol. III, 1878, p. 100.)

Mr. George A. Boardman captured a Golden Eagle under the following circumstances: "When out snipe shooting October 16 (1880), a big Blue Heron flew up and almost immediately dropped to the ground. Instantly a large bird came like a meteor and struck the Heron with full force, and in their excitement I got a fine specimen of the Golden Eagle." (Bull. Nutt. Ornith. Club, vol. VI, 1881, p. 58.)

Although this eagle usually attacks quarry which is easy to secure, Mr. Robert Ridgway shows that it is capable of capturing agile game: "At Camp 19, on the last-named mountains, [East Humboldt, Nev.,] on the 29th of July, we were so fortunate as to witness the chase and capture of a Sage-Hen (*Centrocercus urophasianus*) by a pair of these Eagles. We were standing a few yards in the rear of a tent when our attention was arrested by a rushing noise, and upon looking up the slope of the mountain we saw flying down its wooded side with the rapidity of an arrow a Sage-Hen pursued by two Eagles. The Hen was about 20 yards in advance of her pursuers, exerting herself to the utmost to escape; her wings, from their rapid motion, being scarcely visible. The Eagles in hot pursuit (the larger of the two leading), followed every undulation of the fugitive's course, steadily lessening the distance between them and the object of their pursuit; their wings not moving, except when a slight inclination was necessary to enable them to follow a curve in the course of the fugitive. So intent were they in the chase that they passed within 20 yards of us. They had scarcely gone by, however, when the Sage Hen, wearied by her continued exertion, and hoping, probably, to conceal herself among the bushes, dropped to the ground; but no sooner had she touched it than she was immediately snatched up by the foremost of her relentless pursuers, who, not stopping in its flight, bore the prize rapidly toward the rocky summits of the higher peaks, accompanied by its mate." (U. S. Geol. Expl. of the Fortieth Parallel, King, vol. IV, 1877, p. 591.)

Numerous sensational stories have appeared from time to time relating to the carrying off of children by Eagles, the great majority of which have originated in the fertile brains of their versatile reporters. There is little doubt that if a hungry Eagle found a young baby unprotected it would carry it off. The statements that babies have been carried away by Eagles and later recovered from the nest uninjured are as ridiculous as they are untrue.

Birds of prey always strike their talons deeply into their quarry before carrying it off, unless they are interrupted at the moment they strike. It is possible that some of the stories found in the older books, especially those relating to Europe, may be true, but we know of no authentic instance within the past fifty years of Eagles attacking children. Occasionally when this bird is interrupted while feeding it will attack even a man, as the following from Mr. E. W. Nelson shows: "On one occasion a pair was disturbed by a friend of mine while they were feeding upon the remains of a hog in northern Illinois. As my friend approached the birds arose and swooped fiercely at him. Both birds were shot almost at the muzzle of the gun; the first fell dead almost at his feet, but this apparently seemed only to increase the rage of the survivor, which renewed the attack until it, too, was disabled." (Nat. Hist. Coll., Alaska, 1887, p. 144.)

At certain seasons of the year or in sections where its natural food, wild game, is scarce this bird often becomes very troublesome by attacking the young of domesticated animals. Mr. Oliver Davie speaks of one of these Eagles which was killed near Columbus, Ohio, December 13, 1881. It was alleged that it had killed several young calves, and he ascertained that the bird had been observed feeding upon two of them, but it was not seen in the act of killing them. (Bull. Nutt. Ornith. Club, vol. VII, 1882, p. 123.)

The following letter to Col. Alexander Macbeth, of Georgetown, S. C., shows how destructive Eagles may occasionally become, but may refer in part to the Bald Eagle:

RHEMS, GEORGETOWN COUNTY, S. C.,
May 30, 1889.

DEAR SIR: Yours, 22d instant, at hand, and in reply will say that the eagles are more destructive to the sheep-growing industry in this section than dogs. On one ranch this spring one shepherd alone killed over forty himself, principally by using strychnine. They were worse than we ever knew of before. We lost fully 400 or 500 lambs, as they devour them as fast as they drop from the old sheep. * * * We frequently see during eagle or lambing season, fifteen to twenty eagles in a covey (or bunch), which shows at a glance that they are destructive. We have also a few wildcats that devour the young sheep, but can manage them better than eagles.

Yours very truly.

T. RHEM AND SONS.

MR. ALEX. MACBETH,
Georgetown, S. C.

Mr. Henry Seebohm says of its food in Europe: "The Golden Eagle has been known on one highland sheep farm alone, in the course of a single season, to carry off as many as thirty-five lambs. * * * In deer forests, eagles are of the greatest service; for although they sometimes take a sickly deer calf, they live almost entirely on the blue hares, so troublesome to the deer stalker; and most certainly the deer are the better for the removal of the weak and sickly ones, which would only possibly live to transmit their dis-

eases to posterity. * * * The Golden Eagle (noble as he is thought to be) will eat carrion when pressed for food. * * * The Golden Eagle also preys upon various species of birds, notably the blackcock and red grouse, ptarmigan, curlews, and plovers, dropping upon them unawares or simply taking the young and weakly ones; for never does the bird pursue and strike them like the true falcon." (Hist. of British Birds, vol. I, 1883, pp. 98, 99.)

Occasionally it will attack large animals, as the following from Mr. Charles F. Morrison shows: "The bird had captured and killed a good sized black-tailed deer, and was shot while sitting upon its body." (Ornithologist and Oologist, vol. XIV, 1889, p. 25.)

To sum up, it may be stated that in sections of the country where rabbits, prairie dogs, or gophers are abundant the Golden Eagle is very beneficial, confining its attention mainly to these noxious animals; but in places where wild game is scarce it is often very destructive to the young of domesticated animals, and hence in such places has to be kept in check.

The nest usually is placed on a shelf or ledge on the face of a rocky cliff, or, in some sections of the country, among the branches of large trees. This latter site seems to be more common along the west coast than in other parts of the country. The structure is nothing more than a platform of dry sticks, some of which are several inches in diameter; and as the same place is used for a series of years and new material added each year, the mass acquires very large dimensions, often measuring from 6 to 8 feet in diameter. The cavity is shallow and is lined with dry straw, grass or moss, green leaves, or in the north, the fur and feathers of mammals and birds which have served as food.

The full complement of eggs is from one to four, two or three being the common number. In California the first half of March appears to be the time when most of the eggs are deposited. Occasionally an early set may be found in February or a late one in April. In the far north sets are not completed before the last of April or the first of May.

Some writers allege that this Eagle remains mated throughout life, which is not at all improbable, for generally two birds are seen together at all seasons. The female sits closely during incubation and is attentively cared for and assisted by the male, which, in case the female is killed, takes full charge of the brood. The male is more shy than the female, and hence is less often killed.

A great deal of nonsense has been written about the valor displayed by this bird in protecting its nest and in attacking persons who attempt to rob it of the eggs or young. Interesting as these accounts may be, they have but little foundation in fact, so far at least as this country is concerned, for the birds are arrant cowards, and as soon as the nest is approached leave the neighborhood and do not return, even when there are young in the nest, until after the foragers have passed out of gun range.

Plate 14

BALD EAGLE

This bird when kept in confinement is thought by many to be fierce and untamable, but there are many exceptions, for in certain sections of the West there are few towns which can not boast of a live Eagle, which is oftentimes tame and gentle. When this bird is soaring in the higher air, its flight is truly grand, being equaled in grace by that of few other species. Like many, if not all, of the birds of prey, the Golden Eagle is fond of bathing.

DESCRIPTION.

Legs densely feathered down to base of toes. This character will separate it, in any plumage, from the White-headed Eagle, which is the only other Eagle in the United States.

Length: 30 to 40 inches (760 to 1015^{mm}); extent, 75 to 90 inches (1900 to 2280^{mm}); wing, 23 to 27 inches (580 to 685^{mm}); tail, 14 to 16 inches (355 to 405 ^{mm}).

Table showing the results of examinations of 6 stomachs of the Golden Eagle (Aquila chrysaëtos).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Gaithersburg, Md	Dec. 8, 1887	.....	.....	.....	Carrion.
San Francisco Mountain, Ariz.	Aug. 27, 1889	.....	.....	Abert's squirrel.	
Adams, Ind	Jan. 31, 1887	.....	.....	.....	Empty.
Whipple Barracks, Ariz.	Dec. 14, 1885	.....	.....	.....	Pig carrion.
Vermillion, Clay County, S. Dak.	Jan. 13, 1890	.....	Feathers	.....	
Kcokuk, Iowa	Oct. 31, 1889	.....	.....	Rabbit	

SUMMARY.—Of 6 stomachs examined, 1 contained feathers; 2, mammals; 2, carrion; and 1 was empty.

BALD EAGLE.

Haliæetus leucocephalus.

[Plate 14—Adult.]

The Bald Eagle inhabits North America, ranging south into Mexico, as well as into the northeastern part of Siberia. It occurs along the Arctic Ocean as a summer resident only, though in the greater part of Alaska and southward it is found throughout the year, merely wandering whenever food becomes scarce. It breeds in suitable localities throughout its range.

The favorite food of the Bald Eagle is fish, and when this vertebrate can be procured the bird will touch little else. Of the hundreds of these Eagles which the writer has watched, none were observed ever to touch anything except fish or offal picked up from rivers or along their shores. What proportion of the fish consumed is taken from the Osprey is hard to estimate, but the number must be very great.

Nuttall, in speaking of the food of this bird, says: "Besides fish, he preys upon Ducks, Geese, Gulls, and other seafowl, and when the resources of the ocean diminish, or fail from any cause, particularly on the southern migration of the Osprey, his inland depredations are soon notorious, young lambs, pigs, fawns, and even deer often becoming his prey" (Land Birds, 1832, p. 75).

Mr. H. W. Henshaw, speaking of the food of this bird on the west coast, says: "They are said to annually destroy many of the lambs. I am informed by Lieut. Carpenter that this Eagle at the mouth of the Columbia River is exceedingly numerous, and that here its habits of feeding upon carrion are as regular and fixed as those of the true Buzzards. Its chief dependence is on fish, more particularly Salmon, of which vast numbers are cast up by the waves." (App. JJ, Rept. of the Chief of Engineers, U. S. A., for 1876, pp. 264, 265.)

Speaking of the food of the Bald Eagle in Alaska, Mr. E. W. Nelson says: "In summer they feed upon fish and the numerous wild-fowl which breed among these islands. In winter they feed upon Ptarmigan and the seafowl which reside there during this season. When at the salmon run, in Sanborn Harbor, Nagai, Mr. Dall saw seventeen eagles within 100 yards. During winter he found many eagles dead, but they were too fat to have starved, and he was unable to account for the mystery." (Report Nat. Hist., Collections in Alaska, 1887, p. 144.)

Mr. L. M. Turner, speaking of the same general country, says: "The food of this eagle is rather mixed, consisting of ptarmigans, ducks, and an occasional fish. Any fish or bird that may be thrown dead on the beach is eagerly eaten by this eagle." (Contrib. Nat. Hist. Alaska, 1886, p. 159.)

In parts of the West and Southwest this bird often does considerable good in destroying noxious mammals. Dr. J. G. Cooper says: "The Spanish inhabitants rather encourage its presence, on account of the great number of squirrels it kills; and I have been told of instances where young ones raised from the nest have been kept for several years in a domestic state, going out daily to kill squirrels, and returning to the house at night." (Ornith. Cal., Land Birds, 1870, p. 452.)

Mr. Wm. Lloyd, in a letter dated February 18, 1887, says: "I went to a Bald Eagle's nest on January 28, and though disappointed at finding young just ready to fly, yet I watched the parents bring two prairie dogs to the nest, and skins of this mammal were mixed up in the débris of the nest."

A very interesting instance is mentioned by Mr. Thomas McIlraith of an eagle, which was shot on the shore of Hamilton Bay, Lake Ontario, that had the bleached skull of a weasel dangling from its neck. The teeth were firmly set in the skin of the throat. (Birds of Ontario, 1886, p. 147.)

In certain sections of the country the Bald Eagle appears to be as destructive to domesticated animals as the Golden Eagle is, and un-

doubtedly the depredations that are mentioned in the letter to Col. Alexander Macbeth (p. 95), refer as well to the present species. The following notes from *Forest and Stream* bear on this phase of the subject: "A number of eagles have recently been shot in various parts of Pennsylvania. One, shot by John Hodman in North Coventry, Chester County, had carried off bodily a large lamb and returned the following day after another." (Vol. v, 1875, p. 195.) "A large white-headed eagle swooped down on a flock of sheep here [Hornellsville, N. Y.] and made a breakfast on lamb chops before he could be driven off." (J. Otis Fellows, vol. x, 1878, p. 319.) "It [the Bald Eagle] was killed by a Mr. Towry, near Smithsville, Miss. When found by Mr. Towry it had killed two of his hogs and was dining on one of them." (G. C. E., vol. viii, 1877, p. 17.)

Mr. J. E. West mentions a neighbor who, while watching for geese on the river opposite Wilkinsons Point, near the mouth of Neuces River, North Carolina, saw an Eagle having something in its talons and flying across the river in his direction. As the river at this point is about five miles wide, the bird was evidently becoming very tired and kept flying lower and lower, but finally alighted on the shore within twenty steps of the gunner, who shot it. The object it carried was a little live lamb which was unhurt. (*Ibid.*, vol. iv, 1875, p. 166.) This note shows to what a great distance an Eagle is capable of carrying a burden fully equal to its own weight.

Along the coast of the South Atlantic States and on the lower Mississippi, this Eagle appears to feed more on waterfowl than in any other section of the country. The following note from Mr. William Brewster refers to the vicinity of Cobbs Island, Virginia: "In the winter the Eagles are much more numerous than at any other time of the year, and my informant has, on several occasions, seen as many as eight at once. At this season the neighboring bays and creeks swarm with Wild-fowl, and upon these the Eagles principally live. He has never known them to catch fish of any kind, although they not unfrequently rob the Fish-Hawk. Geese and Brant form their favorite food, and the address displayed in their capture is very remarkable. The poor victim has apparently not the slightest chance for escape. The Eagle's flight, ordinarily slow and somewhat heavy, becomes in the excitement of pursuit, exceedingly swift and graceful, and the fugitive is quickly overtaken. When close upon its quarry the Eagle suddenly sweeps beneath it, and, turning back downwards, thrusts its powerful talons up into its breast. A Brant or Duck is carried off bodily to the nearest marsh or sand-bar, but a Canada Goose is too heavy to be thus easily disposed of. The two great birds fall together to the water beneath, while the Eagle literally tows his prize along the surface until the shore is reached. In this way one has been known to drag a large Goose for nearly half a mile." (Bull. Nutt. Ornith. Club, vol. v, 1880, pp. 57–58.)

Mr. Charles F. Batchelder, quoting Mr. John W. Baker, mentions an

Eagle on the St. Johns River, Florida, which for a period of four or five months made two trips a day to the river for the purpose of obtaining coots (*Fulica*), which it always captured with little difficulty. (Bull. Nutt. Ornith. Club, vol. VI, 1881, pp. 58–60.)

Considerable has been written by the earlier writers about Bald Eagles attacking and carrying off children. We can find no recent record of such an occurrence—except newspaper trash—so give the following from Wilson, which seems trustworthy: "A woman who happened to be weeding in the garden had set her child down near, to amuse itself, while she was at work, when a sudden and extraordinary rushing sound, and a scream from her child, alarmed her, and, starting up, she beheld the infant thrown and dragged some few feet, and a large bald eagle bearing off a fragment of its frock, which being the only part seized, and giving away, providentially saved the life of the infant." (American Ornithology, vol. I, 1831, pp. 26–27.)

What we have said in reference to the Golden Eagle applies equally well to the bird under consideration, namely, that over the greater part of the country where the natural food, fish in the present case, is abundant it is a harmless bird and should be protected; while in sections where it is injurious to sheep or other domesticated animals it should not be allowed to become numerous.

The nest, if this rude structure is entitled to such a name, is a great mass of material in the shape of a platform, often 6 feet across and 3 or 4 feet in depth. It is composed of large sticks with more or less rubbish added in the shape of plant stalks, seaweed, rushes, pieces of turf, vines, and the like. The great majority of nests are placed in large trees, though occasionally a shelf or projecting crag from the steep mountain side is used for a site. The trees chosen are generally live ones of large size, and the nest unlike that of the osprey is placed in a crotch some distance from the top of the tree, from 50 to 60 feet above the ground.

The eggs, which are usually two in number, though occasionally three are found, are deposited at widely different times depending on latitude. In Florida the birds begin to lay in November or early in December, while in Alaska it is often April before full complements of eggs are found. In the same locality there is considerable variation in the time at which different pairs breed. In proof of this Dr. William L. Ralph, during two seasons, found twenty-six sets of eggs of this bird along the Indian River, Florida, between November 25 and February 1. The period of incubation is thirty-six days. Although in Florida the young often leave the nest by the first of April, in Labrador and the mountains of Washington it is nearly July before they do the same. Like the Golden Eagle, the Bald Eagle makes no pretense at guarding its eggs or young against intruders, but leaves the vicinity at the first appearance of the collector and does not return until all danger to itself is over. It is stated that a pair remain united through life, always keeping in the general neighborhood and sharing the products of the chase together.

In the spring when the ice in the rivers and bays is breaking up, the Bald Eagle often becomes very abundant and may be seen on a cake of ice floating back and forth with the tide or perched on some tree near the shore. On the Hudson River Dr. E. A. Mearns states that he has seen twenty-five in sight at once, and the writer, on the border of the same river, has observed nine individuals in one tree.

Like most other birds of prey, this Eagle makes a gentle and interesting pet when taken young, though there is always some danger of it being vicious towards strangers. In localities where the bird is little molested it is not at all shy, but in other sections where war is continually waged against it, it is very difficult to approach.

The flight is strong, although having the appearance of being labored at times, and the bird is capable of carrying a weight exceeding its own. At a distance the note of the Bald Eagle is not altogether unpleasant, resembling somewhat that of the sea gulls, but near by it is grating and suggests a maniacal laugh. Audubon states that the flesh of the young eagles is very good and resembles veal in taste.

DESCRIPTION.

Lower third of leg naked all around. This character will separate it in any plumage from the Golden Eagle, which is the only other Eagle in the United States.

Length: 30 to 43 inches (760 to 1090^{mm}); extent, 80 to 96 inches (2030 to 2440^{mm}); wing, 20 to 28 inches (510 to 710^{mm}); tail, 11 to 16 inches (280 to 405^{mm}).

Table showing the results of examinations of 21 stomachs of the Bald Eagle (Haliæetus leucocephalus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md	Jan. 28, 1887				Carrion.
Oneida Lake, N. Y	Aug. 30, 1886				Sunfish.
Do	do				Fish.
Sing Sing, N. Y	Feb. 27, 1881				Goldfish.
Paint Rock, Tex	Jan. 28, 1887			2 prairie dogs	
Gainesville, Fla	Jan. 13, 1888				Fish and offal.
Fredericksburg, Va	Dec. 5, 1889				Empty.
Rushville, Ill.	Nov. 26, 1883			Mice	
Cincinnati, Ohio	Nov. 10, 1884				Fish.
Do	Jan. 15, 1885			Rats	
Raleigh, N. C	Oct. 29, 1888				Do.
Norfolk, Va	Dec. 1882	Duck			
Isle of Haut, Me	Mar. 17, 1885				Empty.
Highland Falls, N. Y.	Sept. 15, 1874				Eels.
Putnam County, N. Y.	Mar. 12, 1875				Empty.
Dutchess County, N. Y.	June 2, 1876				Goldfish.
Putnam County, N. Y.	Aug. 17, 1876				Empty.
West Point, N. Y	Feb. 15, 1878				Striped bass; fork-tailed catfish.
Garrisons, Putnam County, N. Y.	Mar. 27, 1883				Empty.
Mogollon Mountains, Ariz.	Jan. 8, 1888			Mule deer	
Harrison, S. Dak	Dec. 11, 1891			Meat and hair	

SUMMARY.—Of 21 stomachs examined, 1 contained a game bird; 5, mammals; 9, fish; 2, carrion; and 5 were empty.

GYRFALCONS.

Falco islandus et rusticolus.

Although Gyrfalcons are very important ornithologically and are much sought after by collectors, they possess no great interest from an economic standpoint, since they are never seen in the farming lands of the United States and Canada except in severe winters. It has been thought best, therefore, to include under one article all our four species and races of these birds.

The White Gyrfalcon (*Falco islandus*) inhabits the circumpolar regions, breeding in Greenland and the northeastern portions of Arctic America.

The Gray Gyrfalcon (*Falco rusticolus*) inhabits the extreme northern portions of Europe (except Scandinavia), Asia, and North America, including Iceland and southern Greenland; it occurs south, in winter, as far as the northern border of the United States.

The Common Gyrfalcon (*Falco rusticolus gyrfalco*) inhabits northern Europe, Arctic America from northern Labrador and coasts of Hudson Bay to Alaska.

The Black Gyrfalcon (*Falco rusticolus obsoletus*) inhabits the coast of Labrador, ranging south in winter to Maine, southern Canada, and New York.

All the forms breed far north, and are very rarely seen at any season of the year south of parallel 50°. The food of the Gyrfalcons consists mainly of ptarmigan, grouse, water-fowl, hares, and other birds and mammals of medium size, which inhabit the wild regions in company with them.

Dr. Leonhard Stejneger, speaking of *Falco rusticolus* on Bering Island in winter, says:

"It was at that season by no means uncommon, and fed chiefly on the numerous field mice which now infest that island; but, being very shy, specimens were only secured with great difficulty." (Bull. U. S. Nat. Mus., No. 29, 1885, p. 203.) Of five specimens which he examined one was empty, four contained the remains of meadow mice (*Arvicolæ*), and one the flesh and feathers of a gull.

Audubon gives the following relating to its food: "About its [the nest's] edges were strewed the remains of their food, and beneath, on the margin of the stream, lay a quantity of wings of the Uria troile, Mormon arcticus, and Tetrao saliceti, together with large pellets composed of fur, bones, and various substances. * * * Many were the instances in which I saw these warriors descend like a streak of lightning, pounce on a puffin, and carry it off in their talons." (Ornith. Biography, vol. II, pp. 552–553.)

Mr. H. A. Purdie, speaking of a specimen captured in Piscataquis County, Me., December, 1876, says: "It had caught several hens, and having pursued one under a barn through a small opening, was

itself caught in the arms of a man as it came out." (Bull. Nutt. Ornith. Club, vol. IV, 1879, p. 189.)

Mr. Thomas McIlwraith writes (March 28, 1890) that a correspondent in British Columbia killed a Gray Gyrfalcon as it tried to carry off a mallard he had just shot.

The following relates to it in Greenland and the fur countries: "He [Holböll] mentions having once seen one with a young *Larus tridactylus* in each foot, and another with two *Tringa maritima* carried in the same manner. * * * Richardson often met with it during his journeys over the Barren Grounds, where its habitual prey was the Ptarmigan, and where it also destroyed Plover, Ducks, and Geese." (Hist. N. A. Birds, vol. III, pp. 119–120.)

So rare are these birds in the United States, that a man may consider himself fortunate who sees one in a lifetime.

The nest is placed usually on a ledge or crag of some inaccessible cliff, though in the Anderson River district, Northwest Territory, Mr. MacFarlane found most nests in trees. They were situated in evergreens, from 10 to 25 feet from the ground, some being in the very top, while others were on the lower limbs, resting against the trunk. The nest, which is often a couple of feet in diameter, is made of dry twigs and small branches, and contains a warm lining of moss, seaweed, dry grass, hair, or feathers. The eggs, which are usually from two to four in number, are deposited some time in May, Mr. MacFarlane finding fresh sets from the 10th to 27th of that month. The birds are said sometimes to guard their nests with determination, and even to attack persons who go near them.

There seems to be a great difference of opinion in respect to their flight. Some observers say that it is slow and clumsy, while others state that it is swift and elegant, and equal or superior to that of the Duck Hawk. It is stated that while hunting it rarely sails, but passes forward on rapidly beating wings. The note is loud, shrill, and piercing, and may be heard a long distance.

DESCRIPTION.

Large Hawks with pointed wings: Lower legs densely feathered in front and on sides for the upper two-thirds, the edges of the feathering meeting behind.

White Gyrfalcon: Prevailing color of whole plumage white, streaked with dusky.

Gray Gyrfalcon: Top of head streaked with white; above, more or less distinctly barred with very pale grayish-white or buffy-white, the lighter bars sometimes nearly equal in width to the darker ones.

Common Gyrfalcon: Darker in color than the Gray Gyrfalcon.

Black Gyrfalcon: Lower parts with dusky prevailing, sometimes almost entirely dusky.

Length: 20 to 24.5 inches (508 to 622^{mm}); wing, 13.5 to 16.5 inches (342 to 420^{mm}); tail, 8 to 10.5 inches (203 to 266^{mm}).

PRAIRIE FALCON.

Falco mexicanus.

The Prairie Falcon inhabits the western United States from the eastern border of the Great Plains to the Pacific, and from the northern boundary southward into Mexico. It winters from Kansas, Colorado, southern Idaho, and southern Washington southward, and breeds in suitable localities throughout its range.

The food of this Falcon consists of birds, mammals, reptiles, and the larger insects. Among birds it is partial to prairie hens, doves, blackbirds, and in fact any species whose size furnishes a tempting lure. In the destruction of injurious rodents it is of considerable service. Gophers, prairie dogs, rabbits, and mice are greedily devoured, and often in localities where colonies of the first two animals occur it is seen flying over or sitting near the 'towns' on the lookout for the appearance of its prey. Lizards are occasionally taken, and, among the insects, the large crickets and grasshoppers which are so abundant in some sections of the West are also eaten.

The following is what Mr. Robert Ridgway says of the food of the species: "This daring Falcon was a rather common species throughout the Great Basin. It was first observed on the 31st of October, 1867, at the Humboldt Marshes [Nev.], where we saw one swoop upon a flock of tame pigeons at the stage station. Late in November, of the same year, it was noticed again among the marshes along the Carson River, near Genoa, where it was observed to watch and follow the Marsh Hawks (*Circus hudsonius*), compelling them to give up their game, which was caught by the Falcon before it reached the ground; this piracy being not an occasional, but a systematic habit. In the Truckee Valley we saw one snatch a young chicken from a dooryard, in the presence of several spectators. The quarry of this Falcon is by no means confined to animals smaller than itself, however, for the specimen in our collection was killed while leisurely eating a Jackass Rabbit (*Lepus callotis*), an animal of nearly twice his weight, and which he had carried to the top of a fence post by the roadside. He exhibited no alarm at the approach of our buggy, but continued tearing and devouring his prey. We had even passed by him, without seeing him, when the quick eye of Mr. Parker detected him in time for a shot." (U. S. Geol. Explor. of the Fortieth Parallel, King, vol. IV, 1877, p. 577.) Dr. Coues reported finding one of these birds feeding on an allied species of hare which is fully as large as the above-mentioned one.

Dr. George Bird Grinnell says of this Falcon: "It was seen daily pursuing the blackbirds about the station, and at Medicine Bow one of these birds had almost depopulated the only dove-cote in the town." (Forest and Stream, vol. XII, 1879, p. 365.)

At present the data we have on the food of this Hawk is not enough to decide whether the species should be protected or persecuted.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.	BIRDS.
Spermophilus tridecemlineatus pallidus.	*Lophodytes cucullatus.*
Spermophilus richardsoni.	*Callipepla gambeli.*
	Tympanuchus americanus.
	Zenaidura macroura.
	Otocoris alpestris arenicola.
	Harporhynchus crissalis.

The nest is placed usually on a shelf or in a niche on the perpendicular surface of a 'cut bank,' so common in parts of the West, or among the crevices of rocky cliffs. It is probable that this Falcon also builds in hollows of trees, as the Duck Hawk sometimes does. The eggs, which are usually three in number, though sets of four occasionally have been found, are deposited early in May, and by the latter part of July the young are able to leave the nest.

The Prairie Falcon, as the name implies, is a typical plains bird and inhabits the dry interior. In this respect it differs from the Duck Hawk, for the latter bird is not commonly met with away from tide water or the vicinity of the larger lakes, while the former is just as rare in such localities, the exception being in autumn when it is attracted to the sloughs and lake marshes by the abundance of food, at which time the two species associate.

The flight of this Hawk is swift and graceful, though in most cases it is carried on at no great distance from the ground. It is not a shy bird, except in sections where it has been persecuted and has learned that man is its worst enemy.

DESCRIPTION.

Lower leg feathered for not more than upper half, posterior side almost wholly naked. Top of head grayish brown, streaked with dusky. Above, pale grayish brown indistinctly but broadly barred with pale clay color or bluish gray. Below, white, the flanks heavily spotted or blotched with dusky.

Length: 17 to 20 inches (431 to 509^{mm}); extent, 40 to 43 inches (1015 to 1092^{mm}); wing, 11.60 to 14.30 inches (294 to 363^{mm}); tail, 6.40 to 9 inches (162 to 228^{mm}).

Table showing the results of examinations of 11 stomachs of the Prairie Falcon (Falco mexicanus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sarpy County, Nebr...	Sept. 1874	Prairie hen.	.....	.....	16 locusts.
Cheyenne, Wyo.....	Aug. 3, 1888	.....	.....	Striped gopher..	
Laramie Mountains, Wyo.	Aug. 4, 1888	.....	.....	Richardson's gopher.	6 grasshoppers.
St. Thomas, Nev	Jan. 24, 1889	.....	Horned lark....	.....	
Camp Verde, Ariz.....	June 6, 1885	Gambel's quail.	Mourning dove ..	.....	
Do	Jan. 5, 1886	....do ...	Crissal thrasher	.....	
Do	Jan. 15, 1887	.....	.....	.....	Empty.
Do	Oct. 24, 1887	.....	.....	.....	Do.
Do	Dec. 16, 1887	Hooded merganser.	.....	.....	
Do	Feb. 9, 1888	.....	.....	.....	Do.
Birch Creek, Idaho....	Aug. 7, 1890	.....	Horned lark....	.....	

SUMMARY.—Of 11 stomachs examined, 3 contained, game birds; 5, other birds; 2, mammals; 2, insects; and 3 were empty.

DUCK HAWK.

Falco peregrinus anatum.

[Plate 15—Adult.]

The Duck Hawk inhabits all of America north of Chile. The Peregrine Falcon, of which the Duck Hawk is a geographical race, inhabits Europe and parts of Asia, and appears as a migrant in northern Africa in winter. Another race, Peale's Falcon (*Falco p. pealei*), is restricted to the northwest coast region from Oregon north to the Aleutian and Commander Islands. The Duck Hawk is migratory in the northern part of its range, consequently in fall it becomes more numerous in favorite localities in the United States. On the Atlantic coast it is comparatively rare in winter north of Long Island. It breeds in the eastern United States as far south, at least, as the mountains of North Carolina and Tennessee.

The food of this Hawk consists almost exclusively of birds, of which water-fowl and shore birds form the greater part. In sections of the country where its nesting site is surrounded by cultivated lands, the bird is complained of bitterly by the farmers on account of the inroads it makes on the poultry. Speaking of a pair that had nested near Brandon, Vt., for over twenty years, Mr. F. H. Knowlton says: "They were very destructive to poultry in the vicinity, and many unsuccessful attempts were made to shoot them, until Mr. Winslow, remaining concealed near the nest for an entire day, shot both male and female as they returned about dusk." (Bull. Nutt. Ornith. Club, vol. v, 1880, p. 57.) The stomachs of two specimens secured by Mr. John Krider, not far from Philadelphia, contained the remains of poultry.

Mr. Henry Seebohm, speaking of the food of the European bird, says: "Most species of water-fowl are preyed upon, as well as Grouse and Par-

Bull No 3 Div Ornithology
Bull No 3 Div Ornithology

DUCK HAWK

tridges; but perhaps his favorite food is the Rock-Doves which nestle on the ocean cliffs around him, and the Stock-Doves in the more inland districts." (Hist. British Birds, vol. I, 1883, p. 25.)

In America it often attacks pigeons, and the following note from Mr. George Boudin shows that sometimes it will take up quarters in a large city for that purpose: "On the 13th of September, 1868, I shot a fine specimen (male) at the corner of Fifth and Girard avenue, Philadelphia. For nearly three weeks this bird of prey had made its home in St. Peter's steeple, and lived on pet pigeons. Every day he would come from his hiding place and soar into the air, and start his victims into flight; after they had made two or three circles he would make a dart at the frightened birds, and never missed his prey; he would then seek his hiding place in the cupola and dine on his feathered booty." (Forest and Stream, vol. VIII, 1877, p. 161.)

It has been known also to feed on petrels, small gulls, and terns. Col. A. J. Grayson mentions one which remained near a vessel for two days and captured at least a dozen dusky petrels. (Proc. Bost. Soc. Nat. Hist., vol. XIV, 1872, p. 269.)

Dr. C. Hart Merriam, speaking of a Duck Hawk which was shot on Falkner Island, Connecticut, says: "During her brief visit she had made sad havoc among the Terns, and her crop was greatly distended with their remains, which had been swallowed in incredibly large pieces; whole legs, and the long bones of the wings were found entire and unbroken. Indeed she was perfectly gorged, and contained the remains of at least two adult Terns, besides a mass of newly-hatched young." (Birds of Conn., 1877, p. 82.)

At Oyster Bay, Long Island, New York, Hon. Theodore Roosevelt states that "a pair appeared in September, 1875, and worked great havoc among the night herons. I have seen one fly into a flock of young and kill three without picking up any."

It sometimes takes comparatively small birds. Dr. E. A. Mearns found in the stomach and crop of one he secured at Sayville, Long Island, the remains of a robin, gray-checked thrush, catbirds, and warblers; and Dr. J. G. Cooper says: "I have seen one pursue a swallow, and turning feet upwards seize it flying, with perfect ease. I have also seen them pursue quail near the coast; but their chief prey consists of ducks and other water-birds, which they seize on the wing or on the water, frequently carrying off birds heavier than themselves." (Ornith. Cala., Land Birds, 1870, p. 456.)

It will attack some of the smaller birds of prey, as the following will show: "An individual of this bird was taken by Col. Grayson at the Tres Marias Islands [Mexico]. When shot, it was endeavoring to capture a Sparrow Hawk, indicating its indifference as to the game it pursues. He adds that this bird attacks with vigor everything it sees, from the size of a Mallard Duck down, and is the terror of all small birds." (Hist. North A. Birds, vol. III, 1874, p. 138.)

Speaking of the food of this bird in Florida, Mr. W. E. D. Scott says: "As observed here, this Hawk preys almost exclusively on the Coot (*Fulica Americana*) which occurred in enormous flocks on both lake and river." (Bull. Nutt. Ornith. Club, vol. VI, 1881, p. 17.)

The Duck Hawk is one of the few birds of prey in whose favor little can be said. It is fortunate for the poultry-raisers that the species is comparatively rare throughout our country, and that it is restricted to a large extent to the shores of the ocean and inland bodies of water. The following species of birds were positively identified among the stomach contents: *Anas cyanoptera*, *Callipepla gambeli*, *Zenaidura macroura*, *Harporhynchus crissalis*, *Turdus aliciæ*, *Galeoscoptes carolinensis*, and *Merula migratoria*.

Its flight is marvelously rapid, and it is able to overtake the swift-winged ducks with comparative ease. At times it is difficult to follow with the eye its various movements while in pursuit of its prey.

The nest is placed on some ledge or crag which projects from the surface of a rocky wall or cliff, in one of the clefts on the face of a 'cut bank,' or more rarely in the eroded cavities in the tops of tall trees. The nesting site on the cliffs is often inaccessible, being on a ledge far above the base and under an overhanging portion which prevents approach from above. Even in the far north the eggs are deposited quite commonly on the bare rocks, while in other instances a rude nest is formed of sticks and accidental material which has collected on the shelf, mixed with the fur and feathers of the victims. The holes in the giant sycamores in which Col. Goss and Mr. Ridgway found eggs, contained no nesting material except pieces of rotten wood which had fallen from the sides of the cavities. The Duck Hawk mates in February in most parts of the United States, and at such times is noisy, uttering at short intervals its peculiar note.

The eggs, which are from two to four in number, are deposited early in April, except in the far north, where their deposition is three weeks or a month later. The young are nearly fully fledged in Connecticut by the middle of June, and from Labrador northward not until a month later.

A pair of birds become very much attached to a locality and rear their young in the same place for a long series of years. This Falcon is an inhabitant of the more open country in the vicinity of the sea, the larger rivers, and inland bodies of water, and in such localities extends its range northward to beyond the limit of trees. It is rare on the dry plains of the West, which is the chosen home of the Prairie Falcon.

When taken young it, like the Old World representative, can be easily tamed and becomes much attached to its keeper. In the time of falconry the Peregrine Falcon was highly prized and was considered inferior to none except the White Gyrfalcon. It is a solitary species except during the breeding season, though in a rich hunting ground two or more may be found together, drawn there by the abundance of food. It is a bold,

PIGEON HAWK

Falco columbarius

audacious bird, attacking and killing prey twice its own weight. Nevertheless in some cases it seems to be tyrannized over by the much weaker Marsh Hawk, as several writers have witnessed the latter bird drive it from recently killed quarry.

DESCRIPTION.

First and second wing feathers equal and longest.

Adult.—Top of head black, decidedly darker than back; chest creamy buff, buffy white, or pure white, often unspotted, never very heavily spotted with blackish.

Immature.—Lower parts streaked with dusky. In Peale's falcon the top of the head is dark slaty, uniform with back; chest heavily spotted with blackish.

Length: 15.50 to 20 inches (393 to 508^{mm}); extent, 38.50 to 42 inches (978 to 1068^{mm}); wing, 11.30 to 14.75 inches (286 to 374^{mm}); tail, 6 to 9 inches (152 to 228^{mm}).

Table showing the results of examinations of 20 stomachs of the Duck Hawk (Falco peregrinus anatum).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Portland, Conn	Apr. 29, 1886	Duck			Beetles.
East Bradford, Pa	Feb. 14, 1886		Feathers		
Do	Mar. 27, 1880	Fowl			
Watkins, N. Y	Oct. 28, 1887		Meadowlark		
Elmira, N. Y	Dec. 3, 1887			2 mice	
Sayville, N. Y	Oct. 6, 1880		Gray-checked thrush, warbler, robin, catbird.		
Brookhaven, N. Y	Oct. 1, 1884		Small birds		Dragon-flies.
Do	Oct. 4, 1884	Duck			
Plymouth, Mass	Sept. 28, 1887		Sparrow		
Stratford, Conn	Oct. 1, 1889				Empty.
Camp Verde, Ariz	Aug. 13, 1884		Small birds		
Do	Sept. 15, 1884		Mourning dove, crissal thrasher.		
Tucson, Ariz	May 7, 1885				Empty.
Camp Verde, Ariz	July 10, 1885				Do.
Do	July 30, 1885	Gambel's quail.			
Do	May 27, 1886				Empty.
Do	Aug. 2, 1886	Cinnamon teal.	Other birds		
Do	May 11, 1887		Mourning dove		
Lancaster County, Pa	Dec. 19, 1891	Chicken			
Do	....do	....do			

SUMMARY.—Of 20 stomachs examined, 7 contained poultry or game birds; 9, other birds; 1, mice; 2, insects, and 4 were empty.

PIGEON HAWK.

Falco columbarius.

[Plate 16—Immature.]

The Pigeon Hawk inhabits the whole of North America from the Arctic Ocean southward to the West Indies, Central America, and northern South America. It breeds chiefly north of parallel 43°, though in the mountains it extends south of this latitude, and in the mountains of

some of the West Indian Islands it is a summer resident. It winters sparingly from the more southern portions of its breeding range through the intermediate country to South America. The Black Merlin (*Falco c. suckleyi*), a dark race of the Pigeon Hawk, inhabits the northwest coast from northern California to Sitka.

The food of the Pigeon Hawk consists mainly of small and medium-sized birds, especially the gregarious species, insects, and occasionally small mammals. Pigeons, flickers, and grackles are about as large birds as it usually attacks, though Dr. Dall in one instance saw it kill a ptarmigan and Dr. E. A. Mearns speaks of a specimen shot in the act of destroying a hen. Among insects the dragon flies are favorite morsels for this Hawk, and the apparent ease with which it captures these nimble-winged insects demonstrates better than anything else its remarkable power of flight. The writer has also found grasshoppers, crickets, and beetles among the stomach contents.

Like the Duck Hawk, the species under consideration occasionally captures small mammals when its ordinary food is scarce, though according to Dr. J. G. Cooper, it sometimes feeds quite extensively on them. He says: "Though small, the pigeon hawk has all the fierceness and courage of a true falcon, and captures birds fully as large as itself. It, however, chiefly follows the flocks of gregarious birds, such as blackbirds, doves, etc., and preys much on mice, gophers, and squirrels. I have not heard of its attacking domestic poultry, and those farmers who shoot every 'chicken hawk' that comes around the house would do well to observe them more closely, and will discover that these small species are not the young of the larger ones, and should rather be encouraged than destroyed." (Ornith. Cala., Land Birds, 1870, p. 461.)

Wilson sums up its food as follows: "When the reedbirds, grakles, and red-winged blackbirds congregate in large flights, he is often observed hovering in their rear, or on their flanks, picking up the weak, the wounded, or stragglers, and frequently making a sudden and fatal sweep into the very midst of their multitudes. The flocks of robins and pigeons are honored with the same attentions from this marauder." (Am. Ornithology, vol I, 1831, pp. 61, 62.)

Audubon speaks of its food as follows: "It seizes the Red-breasted Thrush, the Wild Pigeon, and even the Golden-winged Woodpecker, on land; whilst along the shores it chases several species of snipes, as well as the Green-winged Teal." (Ornith. Biography, vol. I, p. 467.)

Mr. John Murdoch mentions four Pigeon Hawks which, on September 5, came out to the vessel as it was crossing the Gulf of St. Lawrence, and says: "The first that appeared had a Leach's Petrel, dead, in his talons. He alighted with this, on the fore crosstrees, and proceeded to eat it." (Bull. Nutt. Ornith. Club, vol. II, 1877, p. 79.)

Dr. Coues, speaking of the species in Labrador, says: "On the 25th of the same month [August], at Henley Harbor, another individual was

seen foraging among the immense flocks of Curlews (*Numenius borealis*) which then covered the hills in the vicinity." (Proc. Acad. Nat. Sci., Phila., 1861, p. 216.)

In Texas, Mr. George B. Sennett secured a bird whose crop contained nearly the whole of a ground dove. Mr. Thomas McIlraith mentions seeing one of these Falcons dive into a flock of blackbirds on one of the marshes of Ontario, and says: "I once saw him 'stoop' on a flock as they hurried toward the marsh for shelter. How closely they huddled together, as if seeking mutual protection, but he went right through the flock and came out on the other side with one in each fist." (Birds of Ontario, 1886, p. 149.)

Occasionally the Pigeon Hawk is quite destructive to young chickens, as the following from the pen of the late Dr. William Wood will show: "In May, 1860, a gentleman who resides some five miles distant, informed me that a small hawk came almost every day and carried off a chicken for him. * * * The next day the same little hawk returned and was shot, and is now in my collection, a beautiful representative of the pigeon hawk." (Am. Nat., vol. VII, 1873, p. 342.)

The following from Dr. B. H. Warren shows it is also injurious to domesticated birds other than chickens: "Two Pigeon Hawks during the late fall lurked about the southern suburbs of the borough of West Chester, preying at regular intervals on the pigeons of a blacksmith. In one week the hawks killed or drove away fifty of the birds. The hawks would enter the boxes and take from them the pigeons." (Birds of Pennsylvania, 1888, p. 100.)

The following species of birds were positively identified among the stomach contents:

Colaptes auratus.
Chætura pelagica.
Dolichonyx oryzivorus.
Spinus tristis.
Certhia familiaris.
Junco hyemalis.
Spizella pusilla.
Spizella socialis.
Melospiza faciata.
Melospiza georgiana.
Passerina cyanea.
Tachycineta bicolor.
Passer domesticus.
Dendroica palmarum.
Vireo olivaceus.
Vireo solitarius.
Turdus.

The nesting site of the Pigeon Hawk is very varied. In some instances the bird deposits its eggs on a ledge or in a cavity on the face of a cliff, in others in the hollows of trees or in nests made among their branches, and occasionally in the deserted nests of other birds. The eggs, deposited on the ledges or in the cavities of cliffs, like those of the Duck Hawk, rarely have much nesting material surrounding them, while those in trees are placed in quite bulky nests. These latter nests, which are found generally in evergreens from 8 to 15 feet from the ground, are composed of twigs, dry grass, and moss, lined with feathers, inner bark, or other soft material.

In California the Pigeon Hawk generally has a full complement of eggs by the middle of April, while in the mountains of Colorado, in Labrador, and farther north, the eggs are not usually all deposited before the 1st of June. The complement of eggs varies from four to six; five being the most common, and six the rarest number. Often when the nest is approached both birds will dart at the intruder, circling within a few feet of his head, at the same time uttering shrill, chattering screams.

This Falcon, with the exception possibly of the Broad-winged Hawk, is the least shy of all of our diurnal birds of prey, and often may be approached within a few rods. It frequents the more open country and edges of woods and is common along the shores of large bodies of water. In September and October during the fall migrations large numbers pass along certain of the sea beaches. The writer was once informed by his lamented friend William L. Breese that on several occasions he had seen hundreds of these little Hawks during the course of a day migrating along the meadows and outer beaches on the south side of Long Island and New Jersey coast.

The flight is very rapid, and resembles that of the wild pigeon quite closely; nor does the similarity end here, for while sitting on a tree the general poise is that of a pigeon in repose, and specimens have been mistaken and shot for the latter bird.

DESCRIPTION.

Middle tail feathers crossed by not more than four blackish or five light bands. Above, bluish gray or brownish; below, whitish, buffy, or light rusty, streaked with brownish or dusky. The Black Merlin is much darker: Above, plain brown; below, heavily marked with dusky.

Length: 10 to 13.25 inches (254 to 336^{mm}); extent, 23.75 to 26.50 inches (604 to 673^{mm}); wing, 7.40 to 8.60 inches (188 to 218^{mm}); tail, 4.65 to 5.50 inches (118 to 139^{mm}).

Table showing the results of examinations of 56 stomachs of the Pigeon Hawk (Falco columbarius).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Shelter Island, N. Y.	Sept. 11, 1886	.....	Small bird	.....	
Portland, Conn	May 6, 1886	.....	Swift	.....	
Lockport, N. Y.	May 14, 1886	.....	Song sparrow	.....	
Rockville, Conn	Sept. 20, 1886	.....	.....	.....	25 crickets, 6 grasshoppers.
Long Island City, N. Y.	May 3, 1886	.....	English sparrow	.....	
Sayville, N. Y.	Sept. 14, 1887	.....	.....	.....	Dragon-flies, other insects.
East Hartford, Conn	Sept. 10, 1887	.....	Small bird	.....	
Sing Sing, N. Y.	May 3, 1880	.....	Feathers	.....	
East Hartford, Conn	Sept. 24, 1886	.....	Indigo bird	.....	
West Chester, Pa.	Feb. 20, 1878	.....	Feathers	.....	
Barton, N. Y.	Aug. 2, 1886	.....	Flicker	.....	
Do	....do	.....	.....	Field mice	Insects.
Do	Aug. 3, 1886	.....	.....	....do	Do.
Elmira, N. Y.	June 4, 1886	.....	English sparrow	.....	
Do	....do	.....	....do	.....	

Table showing the results of examinations of 56 stomachs of the Pigeon Hawk (Falco columbarius)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Elmira, N. Y	July 3, 1885				Grasshoppers, small beetles.
Horseheads, N. Y	Aug. 14, 1885				Small insects.
Elmira, N. Y	Aug. 29, 1885				Grasshoppers, beetles.
Gainesville, Fla	Jan. 4, 1888		Field sparrow, warbler.		
Sing Sing, N. Y	Sept. 26, 1888		Swamp sparrow, chipping sparrow.		
Oakdale, Suffolk County, N. Y.	Sept. 6, 1888		Bobolink		Dragon-fly.
Do	Sept. 20, 1888		Warbler (?)		Dragon-fly.
Queens County, N. Y.	Sept. 24, 1888		Warbler		Dragon-flies, grasshoppers.
Oakdale, Suffolk County, N. Y.	Oct. 12, 1888		2 chipping sparrows.		
Fairfax County, Va	Oct. 13, 1889		Warbler		
Nyack, N. Y	Aug. 10, 1889		Small bird		
West Goshen, Pa	Sept. 29, 1879		Sparrows, pigeon.		
Good Ground, Long Island, N. Y.	Sept. 19, 1882		Small bird		
Montauk Point, N. Y.	Sept. 11, 1885				Grasshoppers, dragon-flies, other insects.
Hunnewells Point, Me.	Sept. 23, 1886		Sparrow (?)		
New Orleans, La	Sept. 24, 1888		White-bellied swallow.		Dragon-flies, caterpillar,
Do	Oct. 4, 1888		English sparrow		Dragon-flies, beetles.
Kenner, La	Nov. 14, 1888		Swamp sparrow		
Raleigh, N. C	Apr. 21, 1888		2 sparrows		
Do	Apr. 22, 1888				Empty.
Albany County, N. Y	Dec. 1, 1881		Sparrow		
Do	Sept. 8, 1887		Feathers		
Rensselaer County, N. Y.	Sept. 10, 1885		Small bird		
Do	Oct. 3, 1887		English sparrow, small bird.		
Anglesea, N. J	Oct. 6, 1889		Feathers		
Montauk Point, N. Y.	Sept. 19, 1889		2 Red-eyed vireos		3 dragon-flies.
Lawrence, N. Y	Sept. 23, 1889		Vireo, brown creeper.		
Oakdale, N. Y	Sept. 25, 1889		Red-eyed vireo, other small bird.		
Rockaway Beach, N. Y.	Oct. 5, 1889		2 small sparrows		3 large dragon-flies.
Lockport, N. Y	May 9, ——	Young chicken	Thrush		
Highland Falls, N. Y.	Sept. 16, 1880	Poultry			
Mogollon Mts., Ariz	Oct. —, 1885				Empty.
Camp Verde, Ariz	Nov. 3, 1887				Do
Keokuk, Iowa	Aug. 21, 1889		Small birds		
Portland, Conn	Sept. 10, 1890		Goldfinch, snowbird.		
Ballston, Va	Oct. 14, 1891		2 English sparrows, 1 other bird.		
Washington, D. C	Apr. 19, 1892		Swamp sparrow		
Portland, Conn	May 9, 1891				Do
Do	Sept. 28, 1891				3 dragon-flies.
Do	Oct. 2, 1891				Empty.
Shrewsbury, Mass	Sept. 17, 1891		1 goldfinch, song sparrow.		

SUMMARY.—Of 56 stomachs examined, 2 contained poultry; 41, small birds; 2, mice; 16, insects; and 5 were empty.

RICHARDSON'S MERLIN.

Falco richardsonii.

Richardson's Merlin inhabits the interior of North America, breeding from Colorado and western Kansas northward, and wintering in Texas, Arizona, and probably Mexico. Stragglers are found westward as far as the Pacific coast. This Falcon is so closely related to the Pigeon Hawk, the main difference being its lighter color, that it is with the greatest hesitation that the writer treats of it separately, especially as intermediate specimens are at hand. So far as known there is nothing in the food, nesting, or other habits in which it differs in the least respect from the Pigeon Hawk, and what is said under the latter bird applies equally well to the former. A specimen shot by Dr. Coues, at the headwaters of the Mouse River, North Dakota, September 8, 1873, was found to contain the remains of a sparrow. The only stomach the writer has examined personally contained the remains of a Lincoln's sparrow, and was collected by Mr. Charles W. Richmond, in Gallatin County, Montana.

DESCRIPTION.

Middle tail feathers crossed by 5 dark and 6 light bands.

Size and color much the same as the Pigeon Hawk, but averaging lighter.

Table showing the results of examinations of 4 stomachs of Richardson's Falcon (Falco richardsonii).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Madison River, Mont.	Sept. 23, 1888	.....	Lincoln's sparrow.	.....	
Camp Verde, Ariz.	Dec. 9, 1887	.....	.....	.....	Empty.
Vermillion, Clay Co., S. Dak.	Mar. 12, 1890	.....	Goldfinch	.....	
Harrison, S. Dak.	Sept. 14, 1891	.....	.....	.....	10 crickets, 1 caterpillar.

SUMMARY.—Of 4 stomachs examined, 2 contained birds and 1 insects, and 1 was empty.

APLOMADO FALCON.

Falco fusco-cœrulescens.

The Aplomado Falcon is a tropical species inhabiting the greater part of South America, Central America, Mexico, and extending northward into southern Texas, New Mexico, and Arizona. The plains, which bear a scattered growth of yucca, mesquit, and cactus, are the home of this bird; and in portions of Arizona and New Mexico, where this character of country exists, it is not an uncommon species.

SPARROW HAWK

Falco sparverius W K
W K
W K

Its food, probably like that of the Pigeon Hawk, consists largely of small birds, insects, and mammals, though little is known positively in reference to it.

Its flight is light and easy. While hunting for food it often hovers over certain spots after the manner of the Sparrow Hawk, and when alighting it generally chooses the bare ground to rest on. Some observers report the bird as being very shy, while others state it is quite tame and unsuspicious.

The nesting site is as variable as the surroundings will allow; sometimes the structure is placed in a yucca or cactus 10 or 15 feet from the ground; while at other times it may be found in a mesquit or other bush a few feet above the surface of the plain. The nest is composed of small twigs and plant stalks and usually has a lining of grass. When the abandoned nests of other birds are available, they are used. The eggs, which are generally three in number, are deposited at any time between the first of April and the middle of May, according to the inclination of the bird. Captain Bendire mentions three young which were found in southern Arizona on April 25, and sets of eggs have been found as late as the middle of June, which shows how variable is the time of nesting.

DESCRIPTION.

Wing more than 9 inches (228 mm.). Above, plain bluish gray; tail darker toward end, tipped with white, and crossed by about eight narrow bands of the same; broad stripes behind eye; chin, throat, and chest, white; the stripe back of the eye changing to orange-rufous on back of head where the two of opposite sides unite. Sides and flanks slaty blackish, narrowly barred with white.

Length: 15 to 18 inches (380 to 457^{mm}); wing, 9.25 to 11.50 inches (234 to 291^{mm}); tail, 6.25 to 8.75 inches (159 to 222^{mm}).

SPARROW HAWK.

Falco sparverius.

[Plate 17 — Adult male and female.]

The Sparrow Hawk is probably the best known as well as the smallest and one of the handsomest of American Hawks. It ranges over the entire continent of temperate North America, breeding in suitable localities from Maine to California, and from the fur countries southward into Mexico. Its nest has been taken as far north as Fort Resolution (latitude 62°), on Great Slave Lake, which probably is near the most northern limit of its distribution. It is reported as rare in most parts of New England, though there are certain sections where it is fairly common. In the mountains of the west and in most parts of the south it is abundant, and at certain times of the

year is common on the Great Plains. In winter a few hardy individuals remain in southern New England and New York, but the species is not common as a winter resident until the latitude of Maryland and Virginia is reached; thence southward it becomes more and more plentiful. In the Mississippi Valley it does not range quite so far north in winter as along the Atlantic, for few are found above the thirty-eighth parallel. Along the Pacific coast it winters considerably further north than in the East.

The subject of the food of this Hawk is one of great interest, and considered in its economic bearings is one that should be carefully studied. The Sparrow Hawk is almost exclusively insectivorous except when insect food is difficult to obtain. In localities where grasshoppers and crickets are abundant these hawks congregate, often in moderate-sized flocks, and gorge themselves continuously. Rarely do they touch any other form of food until, either by the advancing season or other natural causes, the grasshopper crop is so lessened that their hunger can not be appeased without undue exertion. Then other kinds of insects and other forms of life contribute to their fare; and beetles, spiders, mice, shrews, small snakes, lizards, or even birds may be required to bring up the balance. In some places in the West and South telegraph lines pass for miles through treeless plains and savannas. For lack of better perches the Sparrow Hawks often use these poles for resting places, from which they make short trips to pick up a grasshopper or mouse which they carry back to their perch. At times, when grasshoppers are abundant, such a line of poles is pretty well occupied by these hawks.

A dozen or more stomachs collected by Mr. Charles W. Richmond, in Gallatin County, Mont., during the latter part of August and early part of September, 1888, were kindly turned over to this Division for examination. They contained little else than grasshoppers and crickets.

Mr. W. B. Hall, of Wakeman, Ohio, writes to us on the subject as follows: "The Sparrow Hawk is a most persistent enemy of the grasshopper tribe. While the so-called Hawk law was in force in Ohio I was township clerk in my native village and issued certificates to the number of eighty-six, forty-six being for the Sparrow Hawk. I examined the stomachs and found forty-five of them to contain the remains of grasshoppers and the elytra of beetles, while the remaining one contained the fur and bones of a meadow mouse (*Arvicola riparius*)."

Mr. W. E. Saunders writes from London, Canada: "Sparrow Hawks are one of our best grasshopper destroyers; four out of every five I have killed contained grasshoppers alone." The following from the pen of Mr. H. W. Henshaw substantiates what we have said in regard to its fondness for grasshoppers: "It finds * * * an abundant supply of game in the shape of small insectivorous birds; but more especially does its food consist of the various kinds of coleopterous insects and grasshoppers, of which it destroys multitudes. In fact, this last item

is the most important one of all, and where these insects are abundant I have never seen them have recourse to any other kind of food." (Explor. West of 100th Merid., Wheeler, vol. v, 1875, p. 414.)

And subsequently the same author writes: "The west side of Chewaucan Valley has suffered severely from a visitation of that scourge of the western farmer, the grasshoppers. Here in August the sparrow hawks had assembled in hundreds and were holding high carnival, and although in instances like the present their numbers proved wholly insufficient to cope against the vast myriads of these destructive insects, yet the work of the sparrow hawk is by no means so insignificant that it should not be remembered to his credit and earn him well-merited protection. His food consists almost entirely of grasshoppers, when they are to be had, and as his appetite appears never to become satiated, the aggregate in numbers which are annually destroyed by him must be enormous." (Appendix O O of the Annual Report of the Chief of Engineers, U. S. A., for 1879, p. 314.)

The late Townend Glover, formerly entomologist of the United States Department of Agriculture, states that the beneficial traits of this hawk more than counterbalance any harm it may do, and says: "In proof of this, a Sparrow Hawk, shot in October among a flock of reed or rice birds, was found to be filled with grasshoppers, and contained not the slightest vestige of feathers or bones of birds. This bird was remarkably fat." (U. S. Agric. Report, 1865, p. 37.)

Mr. C. J. Maynard, writing on the food of the Sparrow Hawk at Miami, Fla., says: "They have nothing to do but to pick up grasshoppers, of which they appear never to tire. It is true that they can find green grasshoppers and brown grasshoppers, grasshoppers with wings and wingless grasshoppers, but still, as far as any distinctive taste is concerned, there must be but little variation. Yet, to all appearances, the Hawks are satisfied, for I never saw one take any other kind of food." (Birds of Eastern North America, 1881, p. 297.)

Dr. J. G. Cooper says: "This little hawk resides constantly in California, frequenting chiefly the plains, and feeding on grasshoppers, mice, gophers, etc. It must be considered one of the farmers' best friends, and is seldom killed by observing persons." (Ornith. Cal., Land Birds, 1870, p. 463.)

In the vicinity of Washington, D. C., remarkable as it may appear to those who have not interested themselves specially in the matter, it is the exception not to find grasshoppers or crickets in the stomachs of Sparrow Hawks, even when killed during the months of January and February, unless the ground is covered with snow.

It is wonderful how the birds can discover the half-concealed, semi-dormant insects, which in color so closely resemble the ground or dry grass. Whether they are attracted by a slight movement, or distinguish the form of their prey as it sits motionless, is difficult to prove, but in any case the acuteness of their vision is of a character which

we are unable to appreciate. Feeding on insects so exclusively as they do, it is to be presumed that they destroy a considerable number of beneficial kinds, as well as spiders, which they find in the same localities as the grasshoppers. However, examination of their stomach contents shows the number to be so small, compared with that of the noxious species, that it is hardly worth considering.

After the severe frosts of autumn and in winter, when insect life is at its lowest ebb, the Sparrow Hawks devote more time to the capture of mice and small birds. As a rule, the birds which they capture at this time are ground-dwelling species, which simulate the movements of mice by running in or about the dry grass and weeds. They are mostly sparrows, more or less seed-eating, and hence not among the species most beneficial to the agriculturist. At this season it is common to see Sparrow Hawks sitting on the poles over hay stacks, or stationed where they can command a good view of the surroundings of a hay mow or grain crib, ready at any moment to drop upon the mouse which is unfortunate enough to show itself. In this way they manage to destroy a vast number of mice during the colder months.

In the spring, when new ground or meadow is broken by the plow, they often become very tame if not molested. They fly down, even alighting under the very horses for an instant in their endeavor to capture an unearthed mouse or insect.

The following extract from a letter from W. P. McGlothlin, of Dayton, Columbia County, Wash., dated February 12, 1887, contains some interesting facts on this particular subject: "There is a small hawk here called the Sparrow Hawk. It comes about the 1st of March and leaves with its young about August 1st. On their arrival they are in large flocks and seem very hungry. I have had a number follow my team all day long and even alight for a moment on the plow beam. When a mouse was unearthed it was captured in an instant and quickly killed. The hawks seem to know just when their victims are dead. They settle on something suitable to their fancy and commence eating the eyes, and then soon finish. For two weeks this mouse catching goes on. I have sometimes seen them chase and catch small birds. They pair off and drive some woodpecker from his cozy nest in an old tree, where they lay from four to six eggs. When they have young, the small chickens must suffer. About two each day for every nest seems to satisfy them."

Mr. Thomas McIlwraith, in his 'Birds of Ontario,' gives the following on the food of this Hawk: "Though sometimes seen near the farmhouse it does not bear the stigma of having felonious intentions toward the occupants of the poultry yard, but is credited with the destruction of large numbers of mice. * * * It also feeds freely on snakes, lizards, grasshoppers, etc., but has the true falcon etiquette of taking only what is newly killed" (p. 150).

In the opinion of many people, unaccountable as it may appear, the benefit accruing from the destruction of a great number of mice or other

injurious mammals or insects by hawks does not offset the damage done by the capture of one bird or chicken. This, of course, is not the case with those intelligent farmers who recognize the benefit done by this little hawk, and are not prejudiced against it if it exacts a moderate interest now and then in the shape of a young chicken or bird. In May and June, when the hawks are busy hatching their eggs and rearing their young, there is less time for them to procure their favorite food.

It is during this period, as we might expect, that a very large proportion of the birds which they capture in the course of the year is taken. It is also at this time that we hear complaints of their depredations in the poultry yard.

From the following note it may be seen that occasionally they take also old birds from the nests: "In Elizabeth, N. J., several years ago, I saw a pair of Sparrow Hawks fly up under the eaves of an old barn and drag a couple of swallows out of their nests." (Merriam, Review of the Birds of Connecticut, 1877, p. 85.)

That the Sparrow Hawk at times attacks and kills comparatively large birds is vouched for by Mr. C. S. Brimley, of Raleigh, N. C., and Mr. W. G. W. Leizear, of Sandy Spring, Md., both of whom have surprised it while feeding on full-grown quail. And we have found remains of the meadowlark in the stomachs examined.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.

Arvicola riparius.
Arvicola austerus.
Mus musculus.
Sitomys americanus.
Sitomys a. michiganensis.
Blarina exilipes.
Blarina brevicauda.
Sigmodon hispidus.

BIRDS.

Columbigallina passerina.
Sturnella magna.
Sturnella magna neglecta.
Agelaius phœniceus.
Junco hyemalis.
Poocœtes gramineus.
Spizella monticola.
Spizella pusilla.
Melospiza fasciata.
Passer domesticus.
Vireo solitarius.
Zonotrichia coronata.
Zonotrichia l. intermedia.
Thryothorus ludovicianus.

This little Hawk guards the vicinity of its home or hunting ground with zealous care, resenting the invasions of the larger species. The writer has often seen a Red-tailed or Red-shouldered Hawk enter a locality in which a Sparrow Hawk was perched on the top of some tall tree, evidently thinking he had a prior right to the whole region. As soon as the large hawk approached near enough the Sparrow Hawk launched out in pursuit, and in a very short time the intruder was convinced that hunting could be carried on to better advantage in other places. In making an attack the Sparrow Hawk always rises above its enemy and darts down, striking with bill and talons.

In a locality where it is very little molested it is quite tame and unsuspecting, often allowing a person to approach as near as 20 yards

before taking wing, and when flushed it flies but a short distance. It is quite another matter to advance upon one in places where it is more or less hunted. Experience seems to have taught it just how far a gun will carry, and generally it will leave the perch just before an effective point is reached. After following it for an hour or more and taking a few chance shots, the collector usually gives up in disgust and leaves the Hawk in as good spirits as when first seen.

The Sparrow Hawk builds its nest in hollows of trees, either in natural excavations which are formed by erosion of the dead wood by the elements, or in holes made by the larger woodpeckers. If the flicker (*Colaptes*) is the bird imposed upon, which is most often the case, it never openly battles with the Hawk for the retention of its home, but sometimes annoys the latter by removing the nesting material as fast as it is deposited, making it finally necessary for one of the Hawks to remain near to guard the nest.

The cavity chosen is usually a considerable distance from the ground, rarely under 20 feet and often in the tops of the highest trees. In the West, on account of its mode of nesting, the species is more or less restricted in the breeding season to the vicinity of timber, though in some localities it nests in cavities in limestone cliffs or in holes made by kingfishers in the sand banks. It has been stated that occasionally the deserted nests of crows or other birds are made use of, but this habit must be extremely rare. Capt. Charles E. Bendire, whose field experience in the West has been extensive and varied, and often in places where birds by force of circumstances are not able to follow a fixed habit, informed the writer that on one occasion only did he suspect this hawk of breeding in an open nest. In the case in point the evidence was anything but satisfactory, for although the birds were seen near the nest, which was situated in a very large tree, he thought there might have been a cavity which was not visible from the ground. In California, Prof. B. W. Evermann has found it using the deserted nest of the magpie. (Auk, vol. III, 1886, p. 93.) This is not so strange, for we might expect the entrance in the side of the canopied nest of the magpie, simulating an opening in the side of a tree, would attract the hawk, especially in a locality where desirable hollows are scarce.

Dr. William Wood mentions the following interesting instance of departure from its usual nesting habit: "A farmer made a dove house inside of his barn with holes through the sides of the building communicating with it. A pair of doves that had nested there were attacked and killed by a pair of sparrow hawks, who took possession of their nest, laid four eggs, and commenced to sit." (American Naturalist, vol. VIII, 1874, p. 268.)

Mr. John H. Sage (Ornithologist and Oölogist, VI, 1881, 6), reports a similar occurrence at Portland, Conn., where a pair of Sparrow Hawks occupied a pigeon box, but unlike in the preceding case they were in perfect harmony with the pigeons, as the latter occupied three of the

other nests at the same time the Hawks were endeavoring to raise their brood.

In Florida it begins to breed early in March; in the latitude of New York about the middle of May, and in the northern part of its range it is probably June before the eggs are deposited. The number of eggs in one nest is usually five, rarely more.

Its ordinary flight is irregular and not long continued. Even in migration it often stops to rest on a tree top or fence post, where it may remain a considerable time. Still it is capable of very rapid flight. It rarely if ever soars as do most of the other Hawks. Sometimes it makes a succession of rapid beats with its wings and sails for a short distance, but usually, when in search of food, instead of circling it hovers, remaining stationary with rapid-moving wings. If it perceives its quarry it drops to the ground to seize it, and, if successful, bears it away to a neighboring stub or fence pole to devour.

DESCRIPTION.

Small, wings narrow and pointed; top of head bluish gray or dark slate, the crown with or without a rufous patch.

Male.—Tail chestnut rufous, crossed by a broad black band near end; wings grayish blue, more or less spotted with black. Above: Rufous, with or without black bars or spots. Below: Varying from white to deep rufous, with or without black spots.

Female.—Tail, wings, and back crossed by numerous narrow bands of dusky.

Length: 8.75 to 12 inches (222 to 305^{mm}); extent, 20.75 to 22.75 inches (527 to 577^{mm}); wing, 6.55 to 8.15 inches (166 to 207^{mm}); tail, 4.20 to 5.60 inches (105 to 142^{mm}).

Table showing the results of examinations of 320 stomachs of the Sparrow Hawk (Falco sparverius).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Locust Grove, N. Y.	Aug. 18, 1885				Spider, grasshoppers.
Sing Sing, N. Y.	Sept. 22, 1885				Insect remains.
Washington, D. C.	Nov. 3, 1885				Grasshoppers, crickets.
Alfred Centre, N. Y.	Sept. 4, 1885				Larvæ.
Volusia County, Fla.	Mar. 1, 1885				Lizard.
Do	Apr. 4, 1885				2 lizards, insect remains.
Peterboro, N. Y.	July 13, 1886			Hair of mice	
Do	July 24, 1886				Grasshoppers, crickets.
Do	do		Sparrow		Crickets.
Chester County, Pa.	July 28, 1886				Grasshopper and cricket.
Do	do				Grasshoppers and crickets.
Do	Feb. 24, 1886				Larvæ.
East Windsor Hill, Conn.	Feb. 4, 1886				Empty.
Maplewood, N. J	Jan. 16, 1886		Song sparrow		
Do	May 25, 1886		Vireo		
Lockport, N. Y.	Aug. 31, 1886				30 crickets.
Peterboro, N. Y.	July 24, 1886				Grasshoppers and crickets

Table showing the results of examinations of 320 stomachs of the Sparrow Hawk (Falco sparverius)—Continued

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Avon, Ohio	July 5, 1886				Remains of insects.
Baddeck, Nova Scotia	Aug. 13, 1886				Grasshoppers.
Gainesville, Fla	Apr. 20, 1887				Lizard, beetle, larvæ.
Harwood, N. Dak	July 13, 1887			Mouse	
Long Island City, N. Y.	Sept. 16, 1887				Grasshoppers and crickets.
East Hartford, Conn	Sept. 9, 1887				Do.
Portland, Conn	Apr. 12, 1887			Meadow mouse	Remains of insects.
Devils Lake, N. Dak	Aug. 13, 1887				Snake, grasshoppers, crickets, larvæ.
Bottineau, N. Dak	Aug. 27, 1887				Cricket.
Washington, D. C.	Dec. 24, 1887			House mouse	Grasshoppers, beetles.
Do	do				Grasshoppers.
Do	Dec. 25, 1887			House mouse	6 grasshoppers.
Do	Dec. 27, 1887		English sparrow		Grasshoppers.
Sing Sing, N. Y.	Apr. 10, 1880				Do.
Do	Jan. 29, 1883			Meadow mouse	
Do	Jan. 14, 1885			do	
East Hartford, Conn	Sept. 18, 1886		Song sparrow		
Do	July 16, 1886		Sparrow		Grasshoppers.
Do	Oct. 13, 1886			Meadow mouse	Do.
Sandy Spring, Md	Jan. 28, 1887			do	
Do	Mar. 2, 1887			House mouse	Grasshopper.
Do	do			Mouse hair	
Do	do			House mouse	Remains of insects.
Do	do			Meadow mouse	Do.
Do	do			White-footed mouse, house mouse.	
Do	do		Song sparrow		
Do	do				Do.
Do	Mar. 8, 1887		Song sparrow		15 crickets,
Do	Mar. 12, 1887				Grasshoppers, crickets, caterpillars, beetles.
Do	Mar. 18, 1887		Vesper sparrow		Larva.
Do	do			Meadow mouse	Cricket, beetles.
Do	Mar. 24, 1887			House mouse	Cricket, larvæ.
Do	do				Empty.
Do	Apr. 1, 1887			Meadow mouse	
Do	Apr. 8, 1887				Do.
Do	do			Meadow mouse	Crickets, beetle, spider.
Do	Apr. 28, 1887			Mouse	Spider.
Do	May 13, 1887			Meadow mouse	Grasshoppers, white grubs.
Do	June 23, 1887				Grasshoppers and crickets.
Do	Sept. 26, 1887				Grasshoppers, spider.
Do	Oct. 28, 1887				Grasshoppers, crickets, spider.
Do	Jan. 2, 1888			Shrew	Grasshopper.
Do	Feb. 22, 1888			Meadow mouse	
Do	Nov. 26, 1887				Grasshoppers, etc.
Chester County, Pa	Apr. 3, 1886			Meadow mouse	Caterpillars.
Do	Dec. 29, 1886			Mouse	
Do	Dec. 28, 1886			Meadow mouse	Crickets, grasshoppers.
Do	Dec. 29, 1886		Sparrow		
Do	Jan. 17, 1886		Song sparrow	White-footed mouse.	
Do	Feb. 8, 1886		Tree sparrow	do	
Do	Dec. 1, 1886			Meadow mouse	Grasshoppers, cricket, larvæ.
Do	Dec. 3, 1886				Beetle.
Do	Dec. 9, 1886		Junco		
Do	do		Feathers	Meadow mouse; 2 shrews.	
Do	Dec. 16, 1886		do		
Do	Nov. 26, 1886			Meadow mouse	Crickets.

Table showing the results of examinations of 320 stomachs of the Sparrow Hawk (Falco sparverius)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester County, Pa.	Feb. 7, 1887			Meadow mouse	Crickets, caterpillars, spider.
Do	Jan. 12, 1887		Tree sparrow		
Do	Mar. 10, 1886				Empty.
Do	Jan. 6, 1885				Caterpillars, spider.
Do	Mar. 15, 1886				Empty.
Do				Meadow mouse	Grasshoppers, larvæ.
Do	Jan., 1887			do	
Do	do				8 larvæ, spider.
Do	Dec. 20, 1886			Meadow mouse	Larvæ.
Do	Jan. 10, 1887		Song sparrow		
Do	Feb. 9, 1886				Grasshoppers, beetles, larvæ.
Do					Remains of insects.
Do				Meadow mouse	
Do	Jan., 1887			House mouse	Grasshoppers, 10 larvæ.
Do				Meadow mouse	Grasshoppers, larvæ, beetle.
Do	Jan. 25, 1887			House mouse	Crickets, larvæ.
Do	do			Meadow mouse	5 grasshoppers, 5 larvæ, spider.
Do	do			do	
Do	Jan. 27, 1887			do	
Do	Jan., 1887		Tree sparrow	do	Caterpillar, crickets, spider.
Do	Feb. 1, 1887			White-footed mouse.	
Do	do			2 meadow mice	
Do	do				6 caterpillars, 6 grasshoppers, spider.
Do	Nov. 29, 1886				Insects.
Do	July 3, 1886				Do.
Do	Dec. 30, 1879		Meadowlark		
Do	Dec. 16, 1879		Junco	Mice	
Drayton Island, Fla.	Feb. 20, 1885		Feather		Do.
Goshen, Pa.	Jan. 12, 1881			Mice	
West Chester, Pa.	Oct. 27, 1880				Do.
Chester County, Pa.	Dec. 23, 1880		Meadowlark		Do.
Do	Jan. 12, 1881			Mice	
Do	Jan. 17, 1881			do	
Do	Sept. 24, 1880				Grasshopper.
Do	Feb. 16, 1880			Mice	
Delaware County, Pa.	Jan. 30, 1880			do	
Chester County, Pa.	Jan. 4, 1881			do	
East Bradford, Pa.	Jan. 1, 1880				Insects.
Chester County, Pa.	Nov. 20, 1879				Do.
Do	Aug. 25, 1876			Mice	
Do	July, 1870			Bat	
Do	Jan. 16, 1879		Junco	Mice	
Dixon County, Nebr.	July, 1865			Mouse	8 locusts, 27 other insects.
Dakota County, Nebr.	do			Gopher	38 insects.
Do	June, 1866	Quail			29 insects.
Do	July, 1866				34 insects.
Do	Aug., 1867			Rabbit	22 insects.
Cedar County, Nebr.	do			Mice	47 locusts.
Pierce County, Nebr.	July, 1869			Gopher	40 insects.
Sarpy County, Nebr.	Sept., 1871			Mice	37 insects.
Do	June, 1872		Birds		43 insects.
Lancaster Co., Nebr.	Sept., 1873				40 insects, frogs.
Hale County, Ala.	Mar. 17, 1888				Grasshoppers, crickets.
Gainsville, Fla.	Jan. 4, 1888				Remains of insects.
Do	Jan. 9, 1888				Larvæ and other insects.
Los Gatos, Cal.	Dec. 7, 1887		Sparrow		
Do	Dec., 1887				Crickets.
Do	Jan. 19, 1885		Warbler		
Do	Dec. 31, 1887		Meadowlark; sparrow.		

Table showing the results of examinations of 320 stomachs of the Sparrow Hawk (Falco sparverius)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md	Apr. 2, 1888		Field sparrow		White grub, beetles, spider.
Chester County, Pa	Feb. 7, 1887				Caterpillar.
East Bradford, Pa	July 20, 1886			Meadow mouse.	
Chester County, Pa	Aug. 3, 1886				Grasshoppers.
Maplewood, N. J	Jan. 11, 1886		English sparrow.		
Lookout Mountain, Tenn.	Mar. 31, 1882				Lizard.
Buena Vista, N. J	Oct. 11, 1885				Crickets.
Palatka, Fla	Feb. 19, 1881				2 lizards, beetles, grasshoppers.
Keene, N. H	July 10, 1886		Small bird		12 grasshoppers.
Do	July 14, 1886				Grasshoppers.
St. Helena Island, S. C.	Dec. 30, 1884		Ground dove		
New Orleans, La	Oct. 5, 1888				Dung beetles, dragon flies.
Bayou des Allemands, La.	Dec. 18, 1888				Dragon flies.
Brookville, Ind	Mar. 26, 1887			Mouse	
Do	....do			2 meadow mice	
Rensselaer County, N. Y.	Apr. 7, 1879		2 small birds	Mouse	
Do	Sept. 3, 1885				Small black insects.
Do	June 6, 1888			Mice	
Albany County, N. Y	June 13, 1881				Grasshoppers, bones.
Do	Apr. 11, 1882				Grasshoppers, caterpillars, other insects.
Do	Nov. —, 1882		Small bird		
Do	Mar. 9, 1885			Mice	Caterpillars.
Do	Sept. 21, 1886				Grasshoppers, other insects.
Do	Oct. —, 1887				Crickets.
Troy, N. Y	Dec. —, 1886				Empty.
Buffalo Gap, S. Dak	July 2, 1888				6 beetles.
Do	July 3, 1888				Grasshopper.
Do	....do				2 grasshoppers.
Woodville, Minn	Apr. 9, 1888			Meadow mouse.	35 beetles.
East Hartford, Conn	Aug. 30, 1887				Beetles.
Custer, S. Dak	July 17, 1888			Mouse	Grasshopper, beetle.
Bozeman, Mont	Aug. 5, 1888				5 grasshoppers.
Do	....do				7 grasshoppers, lepidopterous larva.
Do	....do				30 grasshoppers, lepidopterous larva.
Do	Aug. 6, 1888				13 grasshoppers.
Do	Aug. 8, 1888				18 grasshoppers.
Do	....do				22 grasshoppers.
Gallatin County, Mont	Aug. 17, 1888				25 crickets and grasshoppers, beetles.
Do	....do				10 grasshoppers, beetles.
Hillsdale, Mont	Aug. 24, 1888				12 grasshoppers.
Gallatin County, Mont	Sept. 9, 1888				20 grasshoppers, 15 crickets.
Do	....do				35 grasshoppers, 24 crickets, 1 dragon-fly, 2 spiders.
Madison River, Mont	Sept. 19, 1888				10 grasshoppers.
Fairmont, W. Va	Sept. 14, 1888				5 grasshoppers, 2 crickets.
Do	Sept. 19, 1888				6 grasshoppers, katydid, spider.
Do	Sept. 20, 1888				25 grasshoppers, 10 katydids, 10 crickets.
Sandy Spring, Md	Dec. 18, 1888			Meadow mouse.	14 crickets, 12 spiders, 13 grasshoppers.
Do	Dec. 28, 1888			....do	2 lepidopterous larvæ.

Table showing the results of examinations of 320 stomachs of the Sparrow Hawk (Falco sparverius)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md	Dec. 28, 1888				12 lepidopterous larvæ, 8 crickets, spider.
Do	Dec. 29, 1888			House mouse	4 crickets, grasshopper.
Amityville, N. Y	Oct. 9, 1888				10 grasshoppers and crickets.
Flatbush, N. Y	April 17, 1888			Meadow mouse	15 lepidopterous larvæ, 2 spiders, grasshoppers, beetle.
Do	Sept. 28, 1888				5 grasshoppers.
Titusville, Fla	Aug. 14, 1888				Lizard, 3 grasshoppers, other insects.
Saint Lucie, Fla	Sept 29, 1888				Beetles, lepidopterous larvæ.
Fort Drum, Fla	Oct. 16, 1888				Cricket, beetle.
Do	....do				Spider, grasshopper.
Cisco, Tex	Sept. 17, 1888				3 large grasshoppers.
Eastland, Tex	Oct. 4, 1888				4 grasshoppers, 4 spiders.
Sandy Spring, Md	Jan. 19, 1889			Meadow mouse	1 lepidopterous larva, 2 crickets.
Do	Jan. 21, 1889			House mouse	
Do	Jan. 22, 1889			....do	
Lawrence, N. Y	Jan. 6, 1889				20 lepidopterous larvæ, cricket, spider, grasshopper.
Phoenix, Ariz	May 14, 1889				Grasshoppers, beetles.
Waterloo, Ind	Aug. 1, 1889				10 grasshoppers, beetle, katydid, spider.
San Francisco Mt., Ariz.	Aug. 2, 1889				12 grasshoppers, beetle.
Do	Aug. 3, 1888				8 grasshoppers.
Do	Aug. 4, 1889				Grasshoppers.
Do	Aug. 6, 1889				Do.
Do	Sept. 5, 1889				Grasshoppers, crickets.
Grand Cañon, Ariz	Sept. 14, 1889				Grasshoppers,
Greensboro, Ala	Sept. 29, 1889		Warbler		Large beetle.
Maryland	Oct. 13, 1889		Redwing blackbird.		
Raleigh, N. C	Oct. 1, 1885				Grasshoppers, beetle larvæ.
Do	Jan. 16, 1886		Carolina wren		
Do	Apr. 5, 1886				2 grubs, small beetles, fly.
Do	Apr. 12, 1886		Sparrow, warbler.		Fly.
Do	Sept. 13, 1886				Insects.
Do	Sept. 26, 1886				Grasshoppers.
Do	Oct. 9, 1886				Do.
Do	Dec. 23, 1886				Do.
Do	Feb. 14, 1887		Small bird		Insect remains.
Do	Feb. 16, 1887		....do		
Do	Apr. 8, 1887			Shrew	
Do	Aug. 26, 1887				Empty.
Do	Aug. 31, 1887				2 lizards, spider, insects.
Do	Sept. 1, 1887				Cricket.
Do	....do				Empty.
Do	Sept. 2, 1887				Grasshopper, katydid.
Do	Sept. 16, 1887				Grasshoppers.
Do	Sept. 22, 1887				Insects.
Do	Oct. 8, 1887				Grasshoppers.
Do	Dec. 29, 1887		Small bird		Do.
Do	July 31, 1888				Lizard, insects.
Do	Oct. 1, 1888				Grasshoppers.
Hale County, Ala	Nov. 28, 1889				25 grasshoppers, 5 crickets, 2 larvæ.

Table showing the results of examinations of 320 stomachs of the Sparrow Hawk (Falco sparverius)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md	Jan. 1, 1890				Grasshoppers.
Do	Jan. 2, 1890			2 house mice	2 grasshoppers, 1 cricket, 1 beetle.
Hale County, Ala	Dec. 28, 1889				2 spiders, 3 beetles, 6 grasshoppers, 10 crickets, larva.
Rockaway, N. Y	Sept. 21, 1889		Sparrow, warbler		Dragon flies.
Do	do				24 crickets.
San Francisco Mt., Ariz	Aug. 3, 1889				8 grasshoppers.
Greensboro, Ala	Feb. 10, 1890			Cotton rat	
West Point, N. Y	Apr. 25, 1877				Empty.
Circleville, Ohio	Dec. 4, 1880				Do.
Prescott, Ariz	Mar. 21, 1884				Moth, other insects.
Camp Verde, Ariz	Apr. 1, 1884				Empty.
Whipple Barracks, Ariz	Apr. 22, 1884				Insect remains.
Yavapai County, Ariz	Apr. 26, 1884				Insects.
Camp Verde, Ariz	Apr. 29, 1884				Empty.
Do	do				Do.
Do	May 2, 1884				Do.
Do	do				Beetles, other insects.
Do	do				Empty.
Do	May 23, 1884				Insect remains.
Do	May 28, 1884				Do.
Do	July 18, 1884				Green grasshoppers.
Do	do				Empty.
Do	Sept. 11, 1884				Do.
Do	Sept. 15, 1884				Crickets.
Do	do				Do.
Do	do				Do.
Do	do				Do.
Do	Sept. 19, 1884				Empty.
Fort Apache, Ariz	Oct. 13, 1884				Insects.
Gila River, San Carlos, Ariz.	Oct. 17, 1884				Beetles, spiders.
Gila River, Arizona	Oct. 19, 1884				Insect remains.
Cataract Creek, Ariz	Nov. 11, 1884				Grasshoppers, butterfly.
Camp Verde, Ariz	Dec. 6, 1884				Empty.
Do	Dec. 17, 1884				Do.
Do	Feb. 9, 1885				Insect remains.
Do	do				Insect remains, spiders.
Do	Feb. 19, 1885				Empty.
Do	Mar. 4, 1885				Caterpillars.
Do	Mar. 20, 1885				Grasshoppers, caterpillars, and beetles.
Do	do				Insects.
Do	Nov. 9, 1885				Grasshoppers, other insects.
Do	Dec. 14, 1885				Empty.
Do	Apr. 4, 1886		Intermediate sparrow.		
Do	Sept. 14, 1886				Grasshoppers.
Do	Dec. 20, 1887				Insects.
Do	Jan. 11, 1888				Empty.
Do	Feb. 8, 1888				Do.
Do	Feb. 13, 1888				Do.
Clay County, S. Dak	Aug. 29, 1889				35 crickets.
Bay St. Louis, Miss	Sept. 3, 1890				5 spiders, larva, katydid.
Morristown, N. J	Sept. 1, 1890				4 grasshoppers.
Portland, Conn	Sept. 10, 1890			Short-tailed shrew.	10 crickets, grasshoppers.
Union County, Ky	Apr. 26, 1890			Hair	White grub, 2 larvæ, spider, grasshopper.
Do	Oct. 4, 1890				15 crickets.
Do	Oct. 11, 1890				Empty.
Do	Oct. 25, 1890				Cricket and beetle remains.
Do	Nov. 5, 1890				8 grasshoppers, 2 crickets.

Table showing the results of examinations of 320 stomachs of the Sparrow Hawk (Falco sparverius)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Union County, Ky	Nov. 28, 1890				20 grasshoppers, 8 dung beetle larvæ.
Do	Dec. 5, 1890				1 grasshopper.
Sandy Spring, Md	Dec. 13, 1890			1 meadow mouse	
Wayne County, Mich	July 6, 1890				Beetle, cricket.
Do	Aug. 18, 1890				5 grasshoppers.
Sandy Spring, Md	Jan. 6, 1891			1 meadow mouse, 3 small short-tailed shrews.	
Do	....do			House mouse, small short-tailed shrew.	
Do	Mar. 21, 1891			House mouse	
Gorham, Maine	Aug. 10, 1889				Grasshopper, cricket, and beetle remains.
Westbrook, Maine	Apr. 21, 1890			Mouse hair	7 caterpillars, 4 crickets, 5 small snakes.
Sandy Spring, Md	Mar. 13, 1892		Small sparrow		Cricket, grasshopper.
Do	Mar. 19, 1892		Tree sparrow	Small short tailed shrew.	
Portland, Conn	Mar. 7, 1891		English sparrow		2 grasshoppers, cricket.
Jacksonville, Ill	Mar. 26, 1892		Small bird		4 crickets, caterpillar.
Do	....do			Meadow mouse	3 crickets.
Do	....do			Mouse	Cricket.
Danville, Tenn	June 29, 1892		Small bird		Beetle.
Sandy Spring, Md	Jan. 6, 1892				Empty.
Do	Jan. 8, 1892			White footed mouse, small short tailed shrew.	
Do	....do				Empty.
Ashton, Minn	May 14, 1892				Green snake, spider, insect remains.
Sandy Spring, Md	Mar. 30, 1892				12 crickets, beetle.
Do	Mar. 15, 1892		Small sparrow		3 caterpillars, 1 beetle.
Do	Jan. 11, 1891			2 house mice	
Do	....do		Song sparrow	House mouse	
Do	....do		2 sparrows		
Do	Jan. 16, 1892		Junco, and small sparrow.		
Do	Jan. 11, 1891			House mouse, meadow mouse	
Do	Jan. 14, 1891			Meadow mouse	
Do	....do				Empty.
Do	Feb. 8, 1892		Tree sparrow		Caterpillar,
Do	Jan. 20, 1892		Junco	2 house mice	
Do	Jan. 14, 1891			House mouse	
Do	Mar. 15, 1892			2 house mice	Beetle; spider.
Provencal, La	May 31, 1892				Centiped, grasshopper.
Onaga, Kans	Apr. 20, 1892			Meadow mouse	Grasshopper and caterpillar remains.

SUMMARY.—Of 320 stomachs examined, 1 contained a gamebird; 53, other birds; 89, mice; 12, other mammals; 12, reptiles or batrachians; 215, insects; 29, spiders; and 29 were empty.

AUDUBON'S CARACARA.

Polyborus cheriway.

Audubon's Caracara is a tropical species inhabiting northern South America, Central America, Mexico, and the southern United States, Florida, Texas, and Arizona. In the southern part of Texas, along the Rio Grande, it is more common in winter than during the warmer months, as individuals from the North join those that summer there. A closely allied species (*Polyborus tharus*) inhabits the whole of South America except the northern part, and a third one (*Polyborus lutosus*) is restricted to Guadalupe Island, Lower California.

The food of the Caracara more closely resembles that of the true vultures than that of the hawks proper. Like the vultures, it feeds greedily on dead animal matter of all kinds, seemingly having little preference for any particular sort. In the vicinity of slaughter-houses or about the carcasses of the larger animals, it may be seen in company with turkey buzzards devouring the bits of offal or carrion. The Caracara feeds also on lizards, snakes, frogs, young alligators, crabs, craw-fish, insects, and young birds. It is very partial to snakes and destroys large numbers of them and also feeds on the dead ones. Small mammals are eaten in considerable numbers. The crops of three halfgrown young which Mr. G. B. Sennett secured at Lomita, Tex., were filled with mice. Lieut. Couch states that it destroys large numbers of the Texas field rat (*Sigmodon berlandieri*). (U. S. and Mexican Boundary Survey, 1852, vol. II, part II, Birds, p. 4.) Mr. H. Nehrling informs us that in catching prairie dogs it hunts in pairs. It will sometimes attack animals as large as full-grown hares, as the following from Dr. J. C. Merrill demonstrates: I have seen a Caracara chase a jackass rabbit for some distance through open mesquit chaparral, and while it was in sight the bird kept within a few feet of the animal and constantly gained on it, in spite of its sharp turns and bounds. If one bird has caught a snake or field-mouse, its companions that may happen to see it at once pursue, and a chase follows very different from what is seen among the vultures. (Proc. U. S. Nat. Mus. vol. I, 1878, p. 153.)

The stomach of a specimen from Florida, which Audubon examined, contained the remains of a bullfrog, numerous hard-shelled worms, and a quantity of horse and deer hair. (Ornith. Biography, vol. II, p. 351.) In certain sections this bird is reported as feeding quite extensively on the ticks which infest the domesticated animals.

Waterfowl which have fallen out of reach of the gunner are taken whenever found. Mr. W. B. Barrows informs the writer that in one instance, while duck shooting in the Argentine Republic, a species closely allied to the one under consideration, attempted to carry off a duck which had been left lying on the surface of the water near him, and it was necessary to make considerable demonstration to scare it off.

The Mexican Eagle, as this species is sometimes called, is an inoffensive bird, feeding for the most part on carrion and offal. Besides doing great service as a scavenger, it destroys numerous small rodents as well as injurious insects, for which it deserves protection.

The nest, which in most cases is a mere platform with a shallow depression, is a bulky structure, composed of small twigs, flags, reeds, coarse grass, or weed stalks, lined with fine grass, leaves, cotton, or Spanish moss. It is to be found in a great variety of situations according to the locality; on the plains where there is a scarcity of suitable vegetation it is placed in low bushes a few feet high, while along the river bottoms where large trees abound, it is located high up among the branches 40 or 50 feet from the ground. The eggs, which are from two to four in number, are deposited in the first half of April, in most if not all portions of its United States range. Both males and females assist in the duties of incubation. In most parts of the country the bird is considered shy, not allowing a person to approach within gun range, though in some of the southern countries it is as tame and unsuspicious as the vultures with which it associates.

The Caracara has the habit in common with some other birds of sitting for hours in an exposed place with ruffled plumage and half-spread wings exposed to the sun, for the purpose of absorbing the warmth of its rays. Unlike most of the birds of prey this species walks on the ground with ease and grace, and is able to catch agile insects by running after them. Unlike most birds of prey the Caracara frequently carries food in its beak while flying, though the larger morsels, as well as the nesting material, are usually held in the talons. The flight is strong and elegant and resembles closely that of the turkey-buzzard.

DESCRIPTION.

General plumage, black, with upper part of back and breast barred with white; lower portion of head, neck, chest, and feathers covering base of tail, soiled white; upper two-thirds of tail white, crossed by about thirteen to fourteen narrow bars.

Length: 20.50 to 25 inches (520 to 635^{mm}); extent, 47 to 49 inches (1194 to 1245^{mm}); wing, 14.50 to 16.50 inches (367 to 419^{mm}); tail, 8.75 to 10 inches (222 to 254^{mm}).

Table showing the results of examinations of 2 stomachs of Audubon's Caracara (Polyborus cheriway).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Magdalena, Mex	Nov. 2, 1889	.....	.....	.....	Maggots; carrion.
Salt River, Arizona	Nov. 19, 1886	.....	.....	Hair	

SUMMARY.—Of two stomachs examined, one contained carrion and maggots and the other mammal remains.

OSPREY.

Pandion haliætus carolinensis.

[Plate 18—Adult.]

The Fish Hawk or American Osprey inhabits tropical and temperate America, ranging north to Labrador, Hudson Bay, and Alaska. It winters commonly in the southern United States, and in this region it breeds regularly in suitable localities north to the limit of its range. It arrives in southern New York in the latter part of March, and in Labrador and the north during the first week in May. The typical species, from which the American bird is scarcely separable, inhabits the whole of Europe, Africa, and northern Asia as far south as India and China.

The food of the Osprey consists entirely of fish which it captures, although in rare cases, when hard pressed, it has been known to pick up dead ones from the surface of the water. From the nature of its food, it must of necessity dwell near bodies of water of more or less extent, which are inhabited by an abundance of fish, especially such species as habitually swim in schools near the surface. In some localities, where there are extensive stretches of shallow water inhabited by an abundance of fish, the Fish Hawk often occurs in colonies of several hundred individuals, while in less favorable localities, a pair or so only are found.

The writer had exceptionally good opportunities in the lower Hudson Valley, New York, to study the bird while procuring its food, and in no instance was it observed to capture any fish except menhaden, herring, goldfish, or sunfish. When preparing to capture a fish this Hawk descends with great velocity at an acute angle, striking the water breast first, often disappearing under the surface in a mass of foam. The writer knows of one instance where an individual in striking at a fish in Croton Lake, New York, broke its wing. The persons observing its descent, wondering why it did not fly away, rowed up and discovered its condition.

The season as well as the locality has considerable to do with the kind of fish caught by the Osprey. It has been known to capture shad, catfish, perch, trout, etc. Wilson speaks of a shad a Fish Hawk captured and had partly eaten, which in that condition weighed six pounds. Nuttall states that fish weighing six to eight pounds are sometimes taken by the Osprey.

It has been said that the Fish Hawk will occasionally strike a large fish like a bass or sturgeon and, being unable to loosen its hold, is carried under and drowned. Large fish with dead Fish Hawks attached have been cast up by the waves on the beach. Although the Osprey feeds exclusively on fish, which in any form are of more or less value to man, with few exceptions, it feeds upon such species as are of the

AMERICAN OSPREY

least use as food. The fishermen, who are the ones most interested, welcome the appearance of this bird in spring, as it indicates the advance of schools of fish and, with few exceptions, they object to its being molested or killed. Fish Hawks are encouraged to nest in the vicinity of the house, not only for the picturesque appearance of the nest and birds, but also because it is believed that they keep off other Hawks which might do damage to the poultry.

The nest is occupied for years and, as new material is added each season, it soon becomes a bulky structure, sometimes measuring five feet in diameter. It is composed of large sticks, brush, rubbish of various kinds, including weed or cornstalks, and lined with soft material. such as seaweed, cedar bark, corn leaves, etc.; in exceptional cases it is composed almost wholly of kelp or other seaweeds. The nest is placed in trees, on telegraph poles, projections from cliffs, deserted buildings, or on the ground among the reeds or some eminence of the open sea beach. A very large proportion of the nests are situated in trees, usually on the top of the tallest in the neighborhood, and in plain sight from the surrounding country. The tree chosen is in most cases dead at the top; it is said that if a live one be selected, after a few years the portion near the nest dies from contact with the large amount of rubbish or the oily and saline deposits on it. In a few cases Fish Hawks have been reported to repair their nests before leaving for the south in the autumn.

The eggs, which are commonly two or three in number, are deposited at widely different dates in the northern and southern portions of its range. In Florida the full complement of eggs is deposited in January, in New Jersey and Maryland in May, and in Labrador and the North during the latter part of June.

The young are slow-growing and remain in the nest a long time after they are fully fledged before attempting to fly, and it is stated that the parents sometimes have to drive them from the nest. The male assists in incubation and also feeds his mate during this period.

The Fish Hawk is a gentle bird and never molests other species, even allowing the grackles and night-herons to build their nests and rear young in the interstices of its own nest. Unlike the Eagles it is a brave bird, defending its home against intruders and even attacking man when he molests its eggs or young.

The Fish Hawk is very much attached to particular trees to which it resorts to devour the fish captured; oftentimes these may be situated several miles from the body of water furnishing the food supply. The flight, like that of many of the heavier birds of prey, is ordinarily slow and labored, but when soaring or flying high in the air it is not surpassed by the Eagles.

DESCRIPTION.

Claws of the same length, narrower and rounder on under side. Above, plain dusky brown, tail more grayish, narrowly tipped with white, and crossed by about six or seven narrow bands of dusky; head, neck, and lower parts white, the chest sometimes slightly blotched with brown; sides of head with dusky stripe, top more or less streaked with dusky.

Length: 20.75 to 25 inches (527 to 635^{mm}); extent, 65 to 70.50 inches (1650 to 1790^{mm}); wing, 17 to 21 inches (432 to 533^{mm}); tail, 7 to 10 inches (178 to 254^{mm}).

Table showing the results of examinations of 12 stomachs of the Fish Hawk (Pandion haliætus carolinensis).

Locality.	Date.	Poultry and game birds.	Other birds.	Mammals.	Miscellaneous.
Ercildoun, Pa	Oct. 5, 1889				Fish.
Bellefontaine, Ohio	Aug. 20, 1889				3 sunfish.
Do	do				Yellow perch.
West Point, N. Y.	Oct. 1, 1873				Fishes.
Highland Falls, N. Y.	May 4, 1874				Do.
Do	Nov. 25, 1873				Goldfish.
Do	Sept. 8, 1874				Empty.
Rockland County, N. Y.	Sept. 4, 1883				Fish.
Yavapai County, Ariz.	June 10, 1886				Hump-backed sucker.
Camp Verde, Ariz	Apr. 21, 1887				Suckers and bony-tails.
Plover Mills, Ont.	Oct. 8, 1884				Mullet.
Morristown, N. J.	Oct. 1, 1890				Tom cod.

SUMMARY.—Of 12 stomachs examined, 11 contained fish, and 1 was empty.

BARN OWL.

Strix pratincola.

[Plate 19—Adult.]

The genus *Strix*, to which our Barn Owl belongs, is chiefly tropical. Both in the northern and southern hemispheres, however it passes into the temperate zones, while the greatest extension of range from the tropics is reached in western Europe, where a species is found common in the British Isles. Closely related species occur in nearly all warm and temperate parts of the globe.

The bird which forms the subject of the present paper is found in the warmer parts of the United States and Mexico, while closely related geographical races occur in the West Indies, Central and South America. Along the Atlantic coast of the United States it is found casually as far north as southern New England and New York. From southern Virginia south and westward, including the southern tier of States, it is not numerous, although in California it is the most abundant Owl. On the Pacific coast it extends northward into Oregon, and in the Mississippi Valley reaches southern Minnesota, Wisconsin, and

BARN OWL

BA *ctincola*, *Bonap.*
BAI
BAI

Michigan, and has been captured in southern Ontario. It migrates more or less in the northern part of its range and there is an appreciable increase in the number of individuals to the southward during the fall months.

Soon after the sun has passed the horizon and the first indications of twilight appear, this Owl emerges from its retreat and hurries to the hunting ground. It commonly resorts to the low meadow, prairie, and marsh lands, where its favorite prey abounds.

All testimony goes to show that the Barn Owl is one of the most beneficial of rapacious birds. Audubon says of the American species: "After long observation, I am satisfied that our bird feeds entirely on the smaller species of quadrupeds, for I have never found any portions of birds about their nests, not even the remains of a single feather in the pellets which they regurgitate, and which are always formed of the bones and hair of quadrupeds." (Ornithological Biography, vol. II, p. 406.)

Mr. W. B. Tegetmeier, in an article on the Barn Owl, says: "The utility of the owl is illustrated by Lord Lilford with a very amusing anecdote. He states that when he was a schoolboy he had a half-grown barn owl that he regaled on one occasion with as many mice as it would swallow. Eight in quick succession disappeared down the capacious gullet of the owl, the ninth followed all but the tail, which for some time hung out of the mouth of the bird, but the quick digestion of these raptores is well illustrated by the fact that in three hours the owl was ready for a second meal, and took four additional mice.

"If this is the performance of a single bird, the effect that the feeding of nests of six or seven young would have on the numbers of rats and mice in a district is self-evident. Lord Lilford says that he has seen a pair of barn owls bring food to their nest no less than seventeen times within half an hour. This rate, if continued for only four hours out of the twenty-four, would give (if we include the animals eaten by the old birds themselves) more than 150 'rats and mice and such small deer' destroyed daily for the support of one nest of owls. Is it surprising that vermin abound where their natural enemies have been exterminated by farmers, gamekeepers, and plumassiers?

"At this present time, when a plague of rats infest many districts of the country, I need make no excuse for quoting the experience of so sound and practical an ornithologist as the president of the B. O. U., on the utility of the barn owl." (Field, vol. LXXV, No. 1956, June 21, 1890, p. 906.)

Its food undoubtedly consists principally of several species of rodents which, from their great numbers and destructive habits, are a curse to the country they inhabit. The pouched gopher is one of the most destructive of this group, not only to vegetable and grain crops, but also to shade and fruit trees. The depredations in the latter case, which consists in the gnawing or entire removal of the roots, are the more serious as they often result in the total destruction of groves and

orchards. In California the favorite food of the Barn Owl is a species of pouched gopher. All the stomachs and pellets which we have received from that State contained the remains of this animal. The following extract from a letter by Clark P. Streator, gives important testimony on the subject:

"In examining a large number of nests at all months of the year, I have found nothing but gophers [*Thomomys*], except on one occasion when there were one or two specimens of Brewer's blackbird. On further investigation I found a deposit of pellets of nothing but gopher hair and bones which had been ejected by the owls, and had accumulated in a few instances to the extent of two or three cubic feet in the trees in which they had lived. I also found that in the breeding season it was not uncommon to find six or more gophers, that were not eaten by the young, laying about the nest. I have found gophers in the nests at other times than the breeding season, but not in such abundance."

Prof. B. W. Evermann, who has had considerable experience with the bird in California, writes of its food as follows:

"Their food consists principally of the gopher (*Thomomys talpoides bulbivorus*) and the California ground squirrel (*Spermophilus grammurus beecheyi*), both of which are so destructive to growing crops and fruit trees on the Pacific coast. Other small mammals, particularly rabbits, birds, and insects go to make up its bill of fare. * * * This owl is not large, yet it must be a very strong and courageous bird, as evinced by the fact that I have often found in its burrows portions of the large jackass hare (*Lepus californicus*) or 'narrow-gauged mule,' as popularly known in California." (Ornithologist and Oölogist, vol. VII, 1882, pp. 97–98.)

In the East its food consists largely of mice and rats, which it destroys with as much energy as it does the gophers in the West. All the common species, including the meadow, house, and white-footed mice, as well as the common rat, are eaten with equal relish.

In certain portions of the Southern States where the cotton rat is very numerous and destructive to many of the crops, the Barn Owl, together with several other species of Hawks and Owls as well as a number of predatory mammals, feeds extensively on them. Four 'pellets' sent by Dr. W. C. Avery, from Greensboro, Ala., contained nothing except the remains of this mammal.

Audubon and Bachman, in their biography of the cotton rat, give the following: "This species supplies a considerable number of animals and birds with food. Foxes and wild-cats especially destroy thousands; we have observed minks coursing along the marshes in pursuit of them, and have frequently seen them with one of these Rats in their mouth. Marsh-hawks and several other species, may be constantly seen in the autumn and winter months sailing over the fields, looking out for the Cotton Rat. No animal in the Southern States becomes more regularly the food of several species of owls than this. The barred owl (*Syrnium*

nebulosum) is seen as early as the setting of the sun, flitting along the edges of old fields, seeking to make its usual evening meal on it or carry it off as food for its young. We were invited some years since to examine the nest of the American barn owl (*Strix Americana*) in the loft of a sugar refinery in Charleston. There were several young of different sizes, and we ascertained that the only food on which they were fed was this Rat, to obtain which the old birds must have gone several miles." (Quad. N. A., vol. I, 1851, p. 231.)

The following extract from an article by Charles Dury is interesting not only in showing to what extent the Barn Owl feeds on rats, but also in pointing out its amicable relations with the domesticated pigeons:

"In October just past Mr. Biggs observed several large birds fly out of the town hall in Glendale. Three of these were killed and proved to be Barn Owls. Mr. Keys also killed one. On October 15 I received two specimens, male and female, that had been killed near Jones Station. In the stomach of one was a mouse, and in the other was an orthopterous insect, commonly called "Katydid" (*Cyrtophyllus concavus*). October 16, Mr. Clifford Allen went to the town hall and placed a ladder up to the tower and climbed up there. There were four owls on a beam looking down at him, and one of these he shot. In this specimen, which was a female, was a nearly grown rat, from which the head had been bitten and the body swallowed entire. Mr. Allen closed the trap-door leading to the tower, and on the 18th I went to Glendale to examine the place. When Mr. Allen went up four owls flew out, one of which was killed, a female. The stomach contained two mice. On going up into the tower I was astonished at the sight presented. The floor and ledges were covered with the cast-up pellets of the birds. It is well known to ornithologists that all raptorial birds swallow much indigestible matter, which is formed into balls in the stomach and afterwards cast up. These are called pellets. In this case they were by hundreds, and covered the floor several inches deep in places. I examined many of them, and found them made up entirely of the hair and bones of the smaller rodents, mostly mice. There must have been the débris of several thousand mice and rats. But the strangest part of the curious habitation was the flock of domestic pigeons that were living seemingly on intimate terms with the owls and, judging from the old pigeon nests, I presume the pigeons had actually nested and reared young there. This seems to show the food of this owl to be almost exclusively mice and rats, and proves it to be a species of the greatest economic value." (Journ. Cincinnati Soc. Nat. Hist., vol, VI, pp. 237, 238.)

Dr. John I. Northrop furnished the following note on the food of this Owl at Andros Island, Bahamas: "On March 25 we found two young ones not yet able to fly, and near by were the remains of the common rat of this island (*Mus rattus*). As is usual with this species, there was no nest, the birds resting on the ground. Around them for some distance the surface was covered with the rejected food balls, composed

of the bones and hair of the rodent above mentioned, and, as no other bones were noticed, it is probable that the Owl's principal article of diet was rat." (Auk, vol. VIII, 1891, p. 75.)

The following in relation to the food of a family of owls found in a church steeple on Long Island is given by Mr. William Dutcher: "The floor on which they were was in a filthy condition, covered with pellets, and dead rats and mice in all stages of decomposition. There were also one young muskrat and some moles." (Auk, vol. III, 1886, p. 440.)

During the summer of 1890 a pair of Barn Owls occupied one of the towers of the Smithsonian building in the city of Washington, where they reared seven young. On June 28, the writer ascended to their home and found the young more than half-grown. The floor was strewn with pellets, and the nest, which was in one corner, was composed of a mass of broken-down ones. An examination of 200 of these pellets gave a total of 454 skulls. Of these, 225 were meadow mice; 2, pine mice; 179, house mice; 20, rats; 6, jumping mice; 20, shrews; 1, star-nosed mole, and 1, vesper sparrow (*Poocætes gramineus*).

Among other mammals on which it feeds more or less commonly, may be mentioned bats, shrews, and moles. Dr. Bernhard Altum, a number of years ago, examined 703 pellets disgorged by this species, and found a total of 2,551 skulls. Of these, 16 were bats; 3, rats; 930, mice; 1,579, shrews; 1, mole; 19, English sparrows, and 3, other birds. (Journal f. Ornithologie, 1863, pp. 43 and 217.)

Mr. W. B. Barrows, in a paper on birds of the Lower Uruguay (Auk, vol. I, 1884, p. 29), states that at night the deserted corridors of the college was one of this Owl's favorite hunting grounds for bats.

A stomach of a specimen from Louisiana, examined by Dr. F. W. Langdon, contained the remains of 4 shrews (*Blarina*) and 4 mice (*Hesperomys*). (Journ. Cincinnati Soc. Nat. Hist., vol. IV, p. 152.)

It is the exception for this owl to feed on birds, and probably it rarely does so except when other food is scarce. In one stomach only of those examined by the writer have the remains of birds been found.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.

Perodipus ordii.
Sitomys eremicus.
Sitomys americanus.
Onychomys melanophrys.
Arvicola riparius.
Arvicola pinetorum.
Blarina exilipes.
Blarina brevicauda.
Sigmodon hispidus.
Zapus hudsonius.
Thomomys umbrinus.
Mus decumanus.
Mus musculus.
Condylura cristata.
Perognathus.
Reithrodontomys.

BIRDS.

Molothrus ater.
Poocætes gramineus.
Passerina amœna.
Pipilo aberti.

Among the large number of skulls of different animals found by Dr. Altum only 22 belonged to birds, of which 19 were those of the worthless English sparrow.

The Barn Owl, like the other Owls, is fond of fish, and their remains have been found in its stomach. An interesting case in which the owl caught its own fish is cited by Seebohm: "Waterton records an instance, which he saw himself, of a Barn Owl dropping down into a pond like an osprey and flying off with a fish." (Hist. British Birds, vol. I, 1883, p. 150.) Insects are more or less often taken, for Prof. Aughey found a considerable number in all the specimens which he examined in Nebraska.

It breeds sparingly in all suitable localities throughout the territory which it inhabits, and in the Southwest, particular in Southern California, it breeds abundantly. Owing to the extensive range of the bird the nesting season varies widely. Thus, Prof. B. W. Evermann found full complements of eggs at Santa Paula, Cal., in February, while in southeastern Texas, H. Nehrling found eggs in the early part of May; in Florida, Maynard found that it nested in March, April, and May. Except in the more northern parts of its range, where it breeds as late as June, it is probable that the majority of eggs are deposited in March.

In Europe the Barn Owl breeds more commonly in old ruins, church belfries, cavities in the abutments of bridges, and old walls. In America, where few suitable ruins and open belfries exist, such nesting sites are comparatively uncommon. The most usual nesting site in the West is in cavities in the sides of gullies, which in California are called *barrancas*. These barrancas are nothing more than miniature cañons, formed in the rainy season by torrents of water washing away the earth. The walls are nearly perpendicular and contain innumerable cavities. Some authors think the birds partially excavate the nesting site, but this seems to be doubtful, and if the holes are enlarged by artificial means it is probably by some rodent. Crevices in rocky cliffs are also used, as well as hollows in stubs and trees, and on one occasion Prof. Evermann found a pair using the deserted nest of a crow (Ornithologist and Oölogist, vol. VII., April, 1882, p. 109). This instance of the use of a deserted nest is the only one which has come to the writer's notice, and the habit must be extremely rare. In the East the habit of nesting in buildings is more frequent than elsewhere in the United States, though various other locations are also chosen. Barns, churches, cupolas of town halls, and ice-houses are used, and in the city of Washington a pair breeds in one of the towers of the Smithsonian Institution.

The nest proper when placed in a cavity, whether of a tree or a bank, is usually nothing more than a few feathers from the parent bird, together with the accidental material found in the hollow. If placed in a building it is more bulky, and is composed generally of the miscellaneous rubbish which collects in such places, combined with the

remains of the broken pellets dropped by the birds. The number of eggs in a nest is usually from four to seven, though Prof. Evermann found sets containing as many as ten in Ventura County, Cal. Undoubtedly, as with other species, the number of eggs depends upon the food supply, the number being greatest where food is most abundant.

The period of incubation is from three to three and one-half weeks. As a bird will occasionally begin to set soon after the first egg is deposited and as eggs are laid on alternate days, the last one will not hatch until two weeks after the first. This habit accounts for the great difference in size in individuals of the same family. When the cavity containing the nest is large enough both birds usually occupy it.

Unlike most of our Owls, which are hardy northern species, enduring very low temperatures with impunity, the Barn Owl seems to be unable to withstand much cold weather; in all probability it sometimes perishes in the northern part of its range, when overtaken by severe weather, before being able to migrate.

This Owl is one of the most distinctively nocturnal of the tribe, but like all the others it can see perfectly well in the brightest daylight, when for any reason it is required to leave its retreat. It usually sleeps during the day, sitting upright in a dark nook or crevice, in the shadow of a bridge or among the dense foliage of some grove or reedy marsh. Except in the breeding season the Barn Owl may be considered more or less gregarious, families of seven or ten individuals being often found together, and colonies of fifty or more have been observed.

Besides its shrieking or screeching note, which is heard more often in spring, it has a nasal one which has been termed a 'snore.' The peculiar and almost ludicrous expression of the physiognomy of this bird, as it sits upright with half-closed eyes, has suggested to the minds of many a fanciful resemblance to a monkey; hence the origin of the name 'Monkey-faced Owl,' which is a common appellation for the bird in many parts of the country, especially Florida. In this State the credulous have been led to believe that certain birds with monkeys' heads exist in the remote recesses of the Everglades. The plumage of this bird is even softer and more silky than that of the other Owls, and its flight, if possible, is more silent.

DESCRIPTION.

Facial disk not circular, but somewhat triangular. Middle and inner claws of equal length; inner edge of middle claw jagged; wing long, reaching beyond tail when folded; tail about half the length of wing.

Color.—Above, ochraceous-yellow, more or less marbled with white or ashy, and speckled with black, and sometimes with white spots. Below, varying in every degree from silky white to bright tawny, dotted with black spots. Eyes small, black.

Length: 15 to 20 inches (381 to 508mm); extent, about 45 inches (1143mm); wing, 13 to 14 inches (330 to 355mm); tail, 5.75 to 7.5 inches (145 to 190mm).

Table showing the results of examinations of 39 stomachs of the Barn Owl (Strix pratincola).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chickamauga, Tenn	Nov. 27, 1885		Cowbird, sparrow.		
Chester County, Pa	May 21, 1886			Meadow mice.	
Do	Dec. 8, 1886	Pigeon.			
Dixon County, Nebr	Aug. —, 1867			Mouse	39 locusts, 22 other insects.
Dakota County, Nebr.	July —, 1868				55 insects.
Lancaster Co., Nebr	June —, 1872			Mouse	40 insects.
Gainesville, Fla	Feb. 4, 1887			2 cotton rats, 2 shrews.	
Washington, D. C	July 5, 1888			1 meadow mouse, 2 jumping mice.	
Poway Valley, Cal	Mar. 17, 1888			1 pocket gopher.	
Do	do			2 pouched gophers.	
San Bernardino, Cal	Jan. 7, 1886			1 pocket gopher.	
Do	do			1 pocket mouse, 8 harvest mice, 1 white-footed mouse.	
Do	do			1 pocket rat, 2 small mammals.	
Do	do			1 pocket gopher.	
Do	Jan. 13, 1886			1 wood rat, 1 mouse.	
Do	do			1 pocket rat.	
Do	do			1 small rodent.	
Do	May 10, 1886			1 pocket gopher.	
Riverside, Cal	May 21, 1886			Small mammals, 1 harvest mouse.	
Do	do			1 pocket gopher.	
San Bernardino, Cal	May 22, 1886			2 meadow mice.	
Woodland, Cal	May 24, 1886			2 field mice	2 grasshoppers, 3 other insects.
Rockville, Md	Nov. 1, 1889			Jumping mouse, meadow mouse, white-footed mouse.	
Sandy Spring, Md	Nov. 2, 1889			2 meadow mice.	
Newport, N. C	Nov. 7, 1889				Empty.
Camp Verde, Ariz	May 31, 1884			Kangaroo rat, white-footed mouse.	
Do	July 27, 1885		Lazuli finch	Small rodents.	
Do	July 29, 1885				Do.
Do	do		Abert's towhee	Small mammals.	
Do	July 30, 1885			Pocket gopher.	
Do	Dec. 16, 1885				Do.
Do	Oct. 3, 1887			Grasshopper mice.	
Morristown, N. J	Oct. 1, 1890			Meadow mouse.	
Little Creek, Del	Dec. —, 1891				Do.
Leesville, Conn	Jan. 11, 1891				Do.
Washington, D. C	Dec. —, 1891			4 house mice	
Do	Apr. 5, 1891			3 meadow mice, 3 shrews.	
Kern River, Cal	July 4, 1891				Do.
Do	do				Do.

SUMMARY.—Of 39 stomachs examined, 1 contained poultry; 3, other birds; 17, mice; 17, other mammals; 4, insects, and 7 were empty.

LONG-EARED OWL.

Asio wilsonianus.

[Plate 20—Adult.]

The Long-eared Owl inhabits the whole of temperate North America ranging south to the table lands of Mexico. In the North it is plentiful in the Saskatchewan and Hudson Bay districts, and Richardson observed it as far as the sixty-first parallel and thought it extended to the limit of trees. Along the Atlantic coast it is found from Nova Scotia to Florida, and is more or less common in the intervening country westward to the Pacific. Mr. Henshaw thinks it is the most common species in Utah, and Mr. Ridgway found it in almost every willow copse from the coast of California eastward into Nevada. There are no records from central and northern Alaska, though probably it occurs commonly in the southern part of the Territory. A representative species is found throughout the temperate parts of Europe and Asia, as well as northern Africa.

The Long-eared Owl is one of our most beneficial species, destroying vast numbers of injurious rodents and seldom touching insectivorous birds. The birds killed by it are mostly seed-eating species, which do not benefit the agriculturist to any great extent. As this Owl is readily destroyed, it is the one that suffers most when short-sighted legislators enact laws for the destruction of birds of prey. It will be seen from the following testimony that it is both cruel and pernicious to molest a bird so valuable and innocent as the one under consideration.

Audubon says: "It preys chiefly on quadrupeds of the genus *Arvicola* and in summer destroys many beetles." (Ornith. Biography, vol. IV, p. 573.)

Nuttall remarks: "Besides mice and rats this species also preys on field mice, moles and beetles." (Land Birds, 1832, p. 131.)

Mr. H. W. Henshaw says: "Their food consists almost exclusively of field mice, of which they kill vast numbers, a fact which should earn them the protection of the farmer." (Report of the Chief of Engineers, U. S. A., 1877, p. 1311.)

Mr. Townend Glover says: "The stomach of one specimen of the Long-eared Owl in the collection contained the skulls and bones of at least 8 field mice, and therefore, when about barns and granaries, these birds must be very useful." (U. S. Agl. Rept., 1865, p. 37.)

Capt. Charles E. Bendire, writing from Camp Harney, Oregon, states: "Their food consists principally of mice and the smaller rodents." (Ornithologist and Oologist, vol. VI, 1882, p. 82.)

Dr. B. H. Warren gives the following: "I have examined the stomachs of twenty-three Long-eared Owls and found that twenty-two of them had fed only on mice; the other examination made of a specimen taken late in the spring showed some beetles and portions of a small bird." (Birds of Pennsylvania, 1888, p. 107.)

AMERICAN LONG-EARED OWL

This Owl is preëminently a mouser, but it also destroys some insects and probably small batrachians and reptiles.

In April, 1888, at Munson Hill, Va., a thickly wooded country about 8 miles from the city of Washington, the writer collected some fifty or more pellets under a tree where one of these Owls had roosted all winter. From this mass were gleaned 176 skulls or parts of skulls, representing the following species: 95 meadow mice (*Arvicola riparius*); 19 pine mice (*A. pinetorum*); 15 house mice (*Mus musculus*); 5 white-footed mice (*Sitomys americanus*); 3 Cooper's mice (*Synaptomys cooperi*); 23 little short tailed shrews (*Blarina exilipes*); 3 short-tailed shrews (*B. brevicauda carolinensis*); and 13 birds, of which 11 were sparrows, 1 a bluebird, and the other a warbler. It might be stated in this connection that the remains of Cooper's mice found on this occasion was the first intimation that the species occurred anywhere in the vicinity.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.	BIRDS.
Perognathus penicillatus.	*Spinus tristis.*
Mus musculus.	*Spizella monticola.*
Sitomys americanus.	*Junco hyemalis.*
Evotomys gapperi.	*Melospiza georgiana.*
Arvicola riparius.	*Melospiza fasciata.*
Arvicola pinetorum.	*Dendroica coronata.*
Synaptomys cooperi.	*Regulus satrapa.*
Blarina b. carolinensis.	*Turdus swainsoni.*
Blarina exilipes.	*Sialia sialis.*
Sorex.	

The Long-eared Owl breeds in suitable localities throughout its range. Its nest is usually a remodeled nest of some bird or mammal, more often of the hawk, crow, magpie, and heron, and occasionally that of the squirrel. The remodeling commonly consists in making the top more or less even and in the addition of a few evergreen twigs, leaves, or feathers as a lining. The situation, of course, varies; some nests are in high trees, others in low trees and bushes, while a few have been found on the ground. But one instance of this species nesting in hollow trees has come to our knowledge, and this is related by Capt. Bendire as occurring at Fort Lapwai, Idaho, and is as follows:

"Two pairs of birds took up their quarters in an old Magpie's nest, and two others in hollow cottonwood trees. In one of the last cases a Red-shafted Flicker had excavated a hole directly over the one occupied by the Owls, and the two entrance holes, although on different sides of the stump, which was only about twelve feet high, were not over two feet apart. These birds seemed to live harmoniously together." (Ornithologist and Oologist, vol. VI, 1882, p. 81.)

Like many other birds of prey its nesting habits have been modified in some parts of the West by the absence of trees, for in many places it

breeds in common with other species in the precipitous cliffs bordering the cañons. Whether it ever builds its own nest, especially those which are found on the ground or in the cliffs, is an open question. The eggs are from three to six in number, five being the most common, in the experience of the writer. Throughout the middle of its range the eggs are deposited usually from the latter part of March to the first week in April, and toward the northern limit it is probably the last of April before the sets are completed. In the southern part of California it nests considerably earlier, as full sets of eggs are found by the latlatter part of February. Capt. Bendire states that the period of incubation is about three weeks. In June the young leave the nest and may be seen with the old birds in some dark retreat. While the female is sitting the male is usually near by, either on the edge of the nest beside her, on a branch of the same or an adjoining tree or occasionally on the ground underneath.

This species, like the Screech Owl, is nocturnal in its habits, and differs from the Short-eared Owl in never hunting during the daytime. It usually spends the day in some evergreen woods, thick willow copse, or alder swamp, although rarely it may be found in open places. On one occasion in October, in the vicinity of Boston, the writer, in company with Messrs. John H. Sage and H. A. Purdie, found one of these birds sleeping among some small deciduous trees which had lost most of their leaves.

Throughout the eastern part of the United States, solitary birds, or less frequently a pair, are usually found during the winter months, while it is common to find small bands or families of six or seven together in summer and early fall. In certain parts of the West the species is gregarious and often as numerous as the Barn Owl.

Mr. H. W. Henshaw says: "It seems to be a habit with this species in the West to congregate together and form colonies, often made up of a large number of individuals. I have, however, noticed this to be most frequently the case in regions where timber was scarce, and doubtless this lack of places suited to the necessities of their nature, which requires them to pass the hours of daylight in some dark, secluded retreat, furnishes the reason for this apparent sociability. In Grass Valley, Utah, I thus found at least a dozen individuals together in a small grove of cedars, and nearly every tree contained one of their nests, rudely made of coarse sticks, while some supported two or three. The birds were roosting on the low branches in the darkest portions of the clump, and they were generally so well concealed that I saw them only as they dashed hurriedly out when I was close upon their retreats" (Explor. West of the 100th Merid., Wheeler, vol. v, 1875, p. 403). And Capt. Bendire speaks of seeing some fifteen or more on a single mesquit tree, near Rillito Creek, Arizona.

Although quiet during the day, and apparently indisposed to venture into the strong light, when started it is able to thread its way

rapidly through the most intricate passages and to evade obstructions, demonstrating that its vision is in no way defective. The bird is not wild, and will allow itself to be closely approached. When conscious that its presence is recognized it sits upright, draws the feathers close to the body and erects the ear tufts, resembling in appearance a piece of weather-beaten bark more than a bird. It makes a very gentle and interesting pet, and will afford great amusement by its numerous antics. An individual which the writer once had would allow itself to be dressed in a doll's hood and shawl by the children. When too roughly handled it would fly to the top of a door, though in a few minutes it would return to them and appeared to be interested in all the details of their play. Mr. F. H. Carpenter (Ornithologist and Oologist, vol. VIII, 1883, p. 62) mentions a peculiar habit in one of these Owls which he reared from the nest. Seeing a basket of chaff which it had learned to know contained young mice, the bird would draw each of its claws through its bill, and, as soon as the material was placed on the floor of the apartment, would fly down and begin the search, scratching after the manner of a hen, at the same time keeping up a contented preening noise.

Like the other Owls, its flight is slow and wavering, but in common with them it is buoyant and devoid of any appearance of heaviness. The note of this Owl is said by some to resemble the noise made by kittens, while others state it is like the barking of small dogs.

DESCRIPTION.

Ear tufts conspicuous, containing eight to ten feathers, and about as long as middle toes with claw.

Color.—Above dusky, mottled with gray, tawny, and blackish; below grayish white with confused marbling of brown, black, and tawny, many feathers with a median longitudinal dusky stripe which gives off transverse bars. Feet and legs tawny and unspotted.

Length: 13 to 16 inches (330 to 406^{mm}); extent, about 39 inches (990^{mm}); wing, 11 to 12 inches (280 to 305^{mm}); tail, 5.50 to 6.50 inches (140 to 165^{mm}).

Table showing the results of examinations of 107 stomachs of the Long-eared Owl (Asio wilsonianus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Coahuila Valley, Cal	Apr. 1, 1886	.....	.....	2 pocket mice	
Washington, D. C	Mar. 27, 1887	.....	Song sparrow	Meadow mouse	
Sheepshead Bay, L. I., N. Y	Nov. 2, 1886	.....	Junco, kinglet	do	
Washington, D. C	Mar. 16, 1887	.....	.....	.....	Empty.
Sandy Spring, Md	Mar. 8, 1887	.....	.....	.....	Do.
Do	Mar. 12, 1887	.....	.....	Meadow mouse	
Do	Mar. 18, 1887	.....	.....	.....	Do.
Do	Nov. 19, 1887	.....	.....	.....	Do.
Do	Jan. 7, 1888	.....	.....	2 meadow mice	
Chester County, Pa	Jan. 11, 1887	.....	.....	Meadow mouse, 3 house mice.	

Table showing the results of examinations of 107 stomachs of the Long-eared Owl (Asio wilsonianus)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester County, Pa	Nov. 20, 1886			Meadow mouse	
Do	Dec. 11, 1886			do	
Do	Jan. 28, 1887			2 meadow mice	
Do	do			White-footed mouse, meadow mouse.	
Do				Meadow mouse.	
Do	Dec. 13, 1886			White-footed mouse, 2 meadow mice, shrew.	
Woodstock, Conn	June, 1887			4 meadow mice.	
Boston, Mass	Oct. 13, 1887		Sparrow, warbler.	Meadow mouse.	
Montgomery Co., Pa	Dec. 26, 1887			do	
Sing Sing, N. Y	Apr. 29, 1880		Goldfinch, 2 sparrows.	Mouse	
Do	do			2 mice	
Do	do		Small bird	do	
Chester County, Pa	Nov. 25, 1886			Mice	
Do	Nov. 10, 1878			do	
Do	Dec. 30, 1884			do	
Westtown, Pa	Feb. 23, 1879			do	
Do	do			do	
Do	do			do	
Chester County, Pa	do			do	
Do	do			do	
Do	do			do	
Do	do			do	
Do	Nov. 22, 1880			do	
Do	Dec. 5, 1879			do	
Do	Feb. 25, 1880			do	
Do	do			do	
Do	do			do	
Do	do			do	
Do	do			do	
Dakota County, Nebr	July —, 1865			Rabbit	Few insects
Elmira, N. Y	Aug. 5, 1885			Field mice	
Do	Aug. 12, 1885			do	
Do	Oct. 13, 1886			do	
Do	do			do	
Nichols, N. Y	July 4, 1887				Empty.
Tioga, Pa	Sept. 2, 1887			Field mice	
Elmira, N. Y	Dec. 21, 1887	Quail			
Poway Valley, Cal	Apr. 5, 1888			Small mammal	
Woodville, Minn	Apr. 6, 1888			2 meadow mice	
Jefferson River, Mont	Sept. 16, 1888				Do.
Washington, D. C	Nov. 25, 1888			White-footed mouse.	
Fairfax County, Va	Dec. 16, 1888			House mouse, white-footed mouse.	
Ogden, Utah	Oct. 12, 1888			2 meadow mice	
Hollis, Queens County, N. Y.	Jan. 4, 1889			Meadow mouse.	
Lake Grove, Suffolk County, N. Y.	May 30, 1889			White-footed mouse.	
Do	do			do	
Do	do			White-footed mouse, meadow mouse.	
Toronto, Canada	Oct. 15, 1889			Meadow mouse, 2 shrews.	
Morristown, N. J	Apr. 5, 1886			Meadow mice	
Do	do		Song sparrow	do	
Fort Hamilton, Long Island, N. Y.	Oct. 9, 1880			Mouse	
Newtown, Conn	Oct. 29, 1880			4 mice	
Indiana	Dec. 23, 1883			Mouse	
Litchfield, Conn	July 1, 1885			3 meadow mice	
Sheepshead Bay, Long Island, N. Y.	Nov. 2, 1886		Sparrow	Meadow mouse.	
Story County, Iowa	Oct., 1883			3 mice	
Rensselaer County, N. Y.	Dec. 12, 1878				Do.
Do	Nov. 28, 1884			3 mice	
Do	Oct. 3, 1886			2 mice	
Saratoga County, N. Y.	Dec. 19, 1879			do	
Washington County, N. Y.	Oct. 18, 1880		Sparrow	Mouse	

SHORT-EARED OWL

Asio accipitrinus

Table showing the results of examinations of 107 stomachs of the Long-eared Owl (Asio wilsonianus)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Albany County, N. Y.	Nov. 20, 1887			Squirrel, mice.	
Rensselaer County, N. Y.	May 6, 1889		Sparrows		
Gaylordsville, Conn	Oct. 15, 1889		Snowbird, warbler.		
Ercildoun, Pa	Dec. 31, 1889			2 meadow mice.	
Long Island City, N. Y	Oct. 29, 1888			do	
Do	Oct. 16, 1888		Song sparrow, 2 other sparrows.		
Huntington, N. Y	Jan. 23, 1890			2 meadow mice, 1 pine mouse.	
Sandy Spring, Md	Mar. 14, 1890				Empty.
Do	do		Sparrow		
Do	May 9, 1890			2 meadow mice.	
Do	do			do	
West Point, N. Y	Apr. 9, 1880				Do.
Do	June 23, 1880				Do.
Circleville, Ohio	Dec. 7, 1881				Do.
Camp Verde, Ariz	Jan. 2, 1886				Do.
Do	Feb. 20, 1886				Do.
London, Ontario	Oct. 16, 1890		Song sparrow	2 meadow mice, 1 red-backed mouse.	
Selden, Suffolk County, N. Y.	May 30, 1889			Meadow mouse, pine mouse.	
Keokuk, Iowa	Oct. 28, 1888			Mouse	
Do	Nov. 7, 1889			4 mice	
Sandy Spring, Md	Nov. 28, 1890			3 meadow mice.	
Do	do			Mouse	
Do	do			do	
Morristown, N. J	Oct. 22, 1890			3 meadow mice.	
Horse Hill, N. J	Oct. 27, 1890		Thrush		
Do	Nov. 5, 1890			2 meadow mice.	
Washington, D. C	Feb. 2, 1891			Meadow mouse.	
Sandy Spring, Md	Dec. 31, 1890				Do.
Do	Nov. 24, 1891				Do.
Lancaster County, Pa	Dec. 16, 1891			2 meadow mice.	
Do	do			2 meadow mice, 1 white-footed mouse.	
Do	Dec. 17, 1891			Pine mouse	
Do	Nov. 10, 1891		Tree sparrow	Meadow mouse.	
Do	Nov. 16, 1891			do	
Do	Dec. 17, 1891			3 meadow mice.	
Rutland, Vt	May 23, 1892			Mouse	Fragments of egg shell.

SUMMARY.—Of 107 stomachs examined, 1 contained a game bird; 15, other birds; 84, mice; 5, other mammals; 1, insects and 15 were empty.

SHORT-EARED OWL.

Asio accipitrinus.

[Plate 21—Adult.]

The Short-eared Owl is a bird of extended distribution, ranging over the greater part of both hemispheres. In Africa it has been found as far south as Abyssinia in winter. It has not been recorded from Australia. In a northerly direction it reaches the southern part of the Arctic regions at about the 69th parallel, from whence southward it probably breeds more or less commonly in favorable localities throughout its range, though as a summer resident it is rare in most parts of eastern United States.

The food of this Owl consists largely of mice and other small mammals. A number of species of insects, birds, and reptiles also may be men-

tioned as occasionally contributing to its fare. Fully 75 per cent of the stomachs examined in the Department of Agriculture contained mice. The remains of as many as six of these little mammals were found in one stomach, and several contained three or four each. Prof. F. E. L. Beal reported finding nothing but mice in the stomachs of a pair which he killed in Story County, Iowa. They were shot in an artificial grove swarming with small birds. Mr. Austin F. Park, of Troy, N. Y., in a report on the food of Hawks and Owls, which he kindly sent to this Department, mentions mice and no other kind of food as found in the stomachs of this species.

Of the other mammals which this Owl feeds upon may be mentioned shrews, gophers, and sometimes small rabbits. Shrews are not uncommon in the stomach contents. Dr. J. C. Merrill, in mentioning the food of this bird at Fort Klamath, Oregon, says: "In one specimen a pellet ready for regurgitation contained ten nearly perfect skulls of a shrew, a species of which, and field mice, were nearly always found in the stomachs." (Auk, vol. v, April, 1888, p. 146.)

Unfortunately we have been unable to procure stomachs of this Owl from the western plains which are infested with ground squirrels and gophers, hence we do not know to what extent it feeds upon these rodents. Mr. G. F. Brenninger, of Beattie, Kans., states (Ornith. and Oologist, xi, 1886, 167) that the food of this species consists chiefly of mice, insects and ground squirrels. It does not feed as extensively on insects as either the Barred or Screech Owls, but there are reports enough on the subject to show that grasshoppers, crickets, and beetles at times form a considerable part of its food. It is quite exceptional for this Owl to feed upon birds. Out of ninety stomachs examined by us at the Department ten contained bird remains.

A notable violation of its usual habit of feeding upon mice may be quoted from Mr. William Brewster, as follows: "A small colony of these birds had established itself upon a certain elevated part of the island [Muskegat], spending the day in a tract of densely matted grass. Scattered about in this retreat were the remains of at least a hundred Terns, that they had killed and eaten. Many of these were fresh, while others were in every stage of decomposition, or dried by the sun and wind. In each case the breast had been picked clean, but in no instance was any other portion disturbed. Every day at a certain time these Owls sallied forth in search of fresh prey. We used regularly to see them about sunset, sailing in circles over the island or beating along the crests of the sand hills. They were invariably followed by vast mobs of enraged Terns, which dived angrily down over the spot where the Owl had alighted, or strung out in the wake of his flight like the tail of a comet. The Owl commonly paid little attention to this unbidden following, and apparently never tried to seize his persecutors while on the wing, but on several occasions we saw a sitting bird pounced upon and borne off. Sometimes in the middle of the night a

great outcry among the Terns told where a tragedy was being enacted." (Bull Nutt. Ornith. Club, vol. IV, 1879, p. 19.)

The following important evidence of the economic value of the Short-eared Owl is from the fourth edition of Yarrell's British Birds (vol. IV, p. 165): "Undoubtedly field mice, and especially those of the short-tailed group or voles, are their chief objects of prey, and when these animals increase in an extraordinary and unaccountable way, as they sometimes do, so as to become extremely mischievous, owls, particularly of this species, flock to devour them. Thus there are records of 'a sore plague of strange mice' in Kent and Essex in the year 1580 or 1581, and again in the county last mentioned in 1648. In 1754 the same thing is said to have occurred at Hilgay, near Downham Market, in Norfolk, while within the present century the Forest of Dean, in Gloucestershire, and some parts of Scotland have been similarly infested. In all these cases owls are mentioned as thronging to the spot and rendering the greatest service in extirpating the pests. The like has also been observed in Scandinavia during the wonderful irruptions of lemmings and other small rodents to which some districts are liable, and it would appear that the Short-eared Owl is the species which plays a principal part in getting rid of the destructive horde. An additional fact of some interest was noticed by Wolley, namely, that under such circumstances the owls seem to become more prolific than usual."

The following species of mammals and birds have been positively identified among the stomach contents:

MAMMALS.	BIRDS.
Arvicola austerus.	*Agelaius phœniceus.*
Arvicola pinetorum.	*Quiscalus quiscula æneus.*
Arvicola riparius.	*Poocœtes.*
Blarina brevicauda.	*Spizella pusilla.*
Sitomys americanus.	*Junco hyemalis.*
Mus musculus.	*Melospiza georgiana.*
Sorex.	*Passerella iliaca.*
Reithrodontomys.	*Passer domesticus.*
Lepus sylvaticus.	*Merula migratoria.*
Sigmodon hispidus.	

The nest is a rough affair made of coarse grass and sticks, loosely drawn together and sparsely lined with fine material and feathers from the parent bird. It is placed on the ground, often in a depression made to receive it, under some bush or among high grass. In exceptional cases it has been found in a clump of low bushes, or otherwise slightly elevated. The eggs, which are from three to five in number, are deposited in April or May, according to the latitude of the nesting grounds.

The Short-eared Owl is pre-eminently a bird of the open country, including the coast marshes and islands covered by bushes and high grass. In the United States it is much more common in winter, receiving large reinforcements from the North. During this season of the year single individuals are usually met with, or less often small colonies,

composed of four or five birds. Possibly these are families which have never been separated, having migrated in company from their nesting grounds. Large colonies, containing several hundred individuals, have been known to congregate in some desirable locality to spend the winter, and it is stated that they occasionally breed in considerable colonies.

DESCRIPTION.

Ear tufts inconspicuous, much shorter than middle toe with claws.

Color: Whole plumage varying from bright tawny to buffy white, with conspicuous dark brown stripes.

Length: 13.75 to 17 inches (350 to 432^{mm}); extent, about 43 inches (1092^{mm}); wing, 12 to 13 inches (305 to 330^{mm}); tail, 5.75 to 6.10 inches (145 to 155^{mm}).

Table showing the results of examinations of 101 stomachs of the Short-eared Owl (Asio accipitrinus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Washington, D. C.	Nov. 22, 1886	.....	2 juncos, 1 fox sparrow.	.....	
Oakdale, N. Y.	Nov. 27, 1886	.....	.....	Mouse	
Rockville, Conn	Oct. 22, 1886	.....	.....	2 meadow mice	
Do	....do	.....	.....	Mouse hair	
Koshkonong, Wis	Sept. 25, 1886	.....	.....	Meadow mouse	
Washington, D. C.	Apr. 20, 1887	.....	.....	3 meadow mice	
Hillsboro, New Brunswick.	Sept. 3, 1887	.....	.....	2 meadow mice	
Washington, D. C.	Jan. —, 1887	.....	.....	1 meadow mouse	
Do	Mar. 28, 1887	.....	Robin	.....	
Hackensack, N. J.	Mar. 31, 1887	.....	.....	2 meadow mice, 1 shrew.	
South Windsor, Conn	Mar. 29, 1887	.....	Sparrow	2 meadow mice	
Do	....do	.....	.....	....do	
Do	Nov. 4, 1887	.....	.....	....do	
Do	....do	.....	.....	5 meadow mice	
Do	....do	.....	.....	4 meadow mice	
Washington, D. C.	Jan. 23, 1888	.....	.....	1 meadow mouse	
Glastonbury, Conn.	Nov. 23, 1886	.....	.....	.....	Empty.
Do	....do	.....	.....	.....	Do.
East Hartford, Conn	Nov. 11, 1886	.....	.....	4 meadow mice	
Do	Nov. 2, 1886	.....	.....	3 meadow mice	
Sandy Spring, Md.	Jan. 28, 1887	.....	.....	Meadow mouse	
Do	Mar. 5, 1887	.....	.....	Mouse	
Do	....do	.....	.....	.....	Do.
Do	....do	.....	.....	.....	Do.
Do	....do	.....	.....	Mouse	
Do	Jan. 7, 1888	.....	.....	2 meadow mice	
Do	Feb. 13, 1888	.....	.....	.....	Do.
Chester County, Pa	Jan. 25, 1887	.....	.....	Meadow mouse	
Do	Dec. 21, 1886	.....	.....	....do	
Do	Dec. 10, 1886	.....	.....	Pine mouse	
Do	Nov. 20, 1886	.....	.....	3 meadow mice	
Do	Nov. 25, 1886	.....	.....	1 meadow mouse	
Do	Nov. 27, 1886	.....	Feathers	.....	
Do	Dec. 8, 1886	.....	.....	Meadow mouse	
Do	Mar. 5, 1887	.....	.....	.....	Do.
Do	.....	.....	.....	Mice	
Do	Jan. 4, 1880	.....	.....	....do	
Do	Jan. 5, 1880	.....	.....	....do	
Dakota County, Nebr.	July —, 1870	.....	.....	Rabbit	17 insects.
Lincoln, Nebr	Sept.—, 1868	.....	.....	Gopher	30 locusts.
Elmira, N. Y.	Aug. 13, 1884	.....	.....	Field mice	Beetle.
Do	Aug. 2, 1886	.....	.....	....do	Do.
Do	Aug. 7, 1886	.....	.....	....do	Do.
Erin, N. Y	Oct. 5, 1887	.....	.....	....do	Do.
Do	Dec. 29, 1887	.....	.....	....do	Do.
Kings County, N. Y.	Dec. 26, 1887	.....	.....	4 white-footed mice, 2 house mice, 1 shrew.	
Stratford, Conn	Nov. 3, 1888	.....	.....	Meadow mouse	
Sandy Spring, Md	Dec. 10, 1888	.....	.....	Mouse hair	

Table showing the results of examinations of 101 stomachs of the Short-eared Owl (Asio accipitrinus)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
St. George, Utah	Jan. 8, 1889			White-footed mouse, harvest mouse.	
Washington, D. C	Mar. 13, 1889		Fox sparrow, and another sparrow.		
Lawrence, Queens County, N. Y.	Jan. 12, 1889			3 meadow mice	
Hancock County, Iowa	July 15, 1889			2 meadow mice, 2 shrews.	
Do	July 18, 1889			2 meadow mice	
Chester County, Pa	Nov. 28, 1882			Mice	
Jersey City, N. J	Oct. 14, 1888		Sparrow	Meadow mouse	
Story County, Iowa	Oct. —, 1883			Mouse hair	
Do	Jan. —, 1883			do	
Raleigh, N. C	Nov. 11, 1886			do	
Do	Nov. 8, 1887			Cotton rat	
Do	Nov. 12, 1887				Empty.
Do	Jan. 12, 1888			Meadow mice	
Cincinnati, Ohio	Nov. 9, 1884			Mice	
Do	Nov. 11, 1884		2 English sparrows.		
Franklin County, Ind	Dec. 3, 1886			2 mice	
Springfield, Ind	Dec. 6, 1886			Mouse hair	
Brookville, Ind	Jan. 10, 1887			2 mice	
Adams, Ind	do				Do.
Do	do			2 mice	
Fayette County, Ind	do			2 mice, 2 shrews.	
Union County, Ind	Jan. —, 1887			2 meadow mice	
Adams, Ind	Jan. 27, 1887			1 meadow mouse	
Springfield, Ind	Apr. 1, 1887			White footed mouse, meadow mouse.	
Rensselaer County, N. Y.	Jan. 18, 1888				Empty.
Albany County, N. Y.	Feb. 1, 1879			Meadow mice	
Do	Feb. 7, 1886			Mouse	
Do	do				Empty.
Do	Feb. 9, 1888				Empty.
Do	Mar. 30, 1888			Mouse	
Rensselaer County, N. Y.	Mar. 3, 1889			Meadow mice	
Stratford, Conn	Nov. 13, 1889		Swamp sparrow, other sparrow.		
Flatbush, N. Y	Nov. 2, 1889				Empty.
Long Island City, N. Y.	Oct. 26, 1888		2 snowbirds, 1 grass finch, 1 field sparrow.		
Montauk Point, L. I., N. Y.	Dec. 12, 1889			Meadow mouse, white-footed mouse, shrew.	
Kennedy, Nebr	Apr. 15, 1890			Meadow mice, white-footed mice.	
Clay County, S. Dak	Sept. 12, 1889			White-footed mouse.	
Do	Oct. 27, 1889			White-footed mouse, meadow mouse.	
Keokuk, Iowa	Nov. 8, 1885		Grackle		
Do	Jan. 1, 1890			Mouse	
Portland, Conn	Oct. 8, 1890				Empty.
Union County, Ky	Nov. 5, 1889			3 meadow mice	
Sandy Spring, Md	Dec. 13, 1890				Empty.
Do	Dec. 20, 1890			2 meadow mice	
Do	do			do	
Montauk Point, L. I., N. Y.	Dec. 5, 1890			Meadow mouse	
Do	do			2 meadow mice	
Morristown, N. J	Jan. 24, 1891			Meadow mouse	
Do	Feb. 10, 1891			3 meadow mice,	
Washington, D. C	Nov. 20, 1891			3 meadow mice, 1 house mouse.	
Lancaster County, Pa.	Dec. 19, 1891			4 meadow mice	
Do	Dec. 21, 1891			3 meadow mice	
Do	Dec. 22, 1891		Red-wing blackbird.	Meadow mouse	

SUMMARY.—Of 101 stomachs examined, 11 contained small birds; 77, mice; 7, other mammals; 7, insects, and 14 were empty.

BARRED OWL.

Syrnium nebulosum.

[Plate 22—Adult.]

The Barred Owl inhabits eastern North America, ranging from Nova Scotia southward to the Gulf of Mexico, and westward to Manitoba, Dakota, Kansas, and Texas. Three geographical races inhabit, respectively, the southern United States from Florida to Texas (*Syrnium n. alleni*), eastern Mexico (*Syrnium n. sartorii*), and Central America (*Syrnium n. fulvescens*). The species is resident throughout its range except in the extreme northern part, from which it migrates more or less every fall and winter.

Relating to the food of this species, Audubon gives the following: "The Barred Owl is a great destroyer of poultry, particularly of chickens when half grown. It also secures mice, young hares, rabbits, and many species of small birds, but is especially fond of a kind of frog of a brown color very common in the woods of Louisiana. I have heard it asserted that this bird catches fish." (Ornith Biography, vol. I, p. 244.)

Nuttall gives the following information as to the food: "Their food is principally rabbits, squirrels, grouse, quails, rats, mice, and frogs. From necessity as well as choice they not unfrequently appear around the farmhouse and garden in quest of the poultry, particularly young chickens." (Land Birds, 1832, p. 134.)

"Mr. Downes observed them to feed on hares, spruce and ruffed grouse, and other birds in Nova Scotia" (Hist. N. A. Birds, vol. III, p. 36).

Mr. H. Nehrling says: "In Texas where the hens, turkeys, etc., roost on trees, this owl is very destructive. They do not kill old poultry, but like half-grown chickens, and soon depopulate a whole poultry yard." (Bull. Nuttall Ornith. Club, vol. VII, p. 172.)

Dr. Wheaton, in his report on the birds of Ohio, 1882, gives a summary of its food as follows: "It sometimes visits chicken roosts and causes great devastation, but its ordinary food consists of squirrels, rats, mice, and small birds" (p. 412).

To all this testimony, which could be increased by the addition of many other notes attesting the destructiveness of the species to poultry and game, the investigations of the writer are in direct variance. Of the 109 stomachs examined four only contained the remains of poultry, and in one the trace of a game bird were found.

Dr. William C. Avery, of Greensboro, Ala., one of our valued correspondents, writes: "One evening about sunset while I was hunting, a Barred Owl pitched upon a wounded Bob-white which I had just shot." This incident recalls the interesting question of the part played by birds of prey in destroying sickly or wounded game. The following from Prof. Baird to Mr. J. W. Shorton, which was published in the

bulosum

common. That it does occasionally make inroads upon the poultry yard and does more or less damage among game birds, is true; but the systematic collection and examination of a large number of stomachs show the exceptional character of such acts and reveal the fact that the larger part of its food consists of mammals. And it is to be noted that among the list are some of the most destructive rodents the farmer has to contend with. If a fair balance be struck, therefore, it must be considered that this Owl is on the whole beneficial, and hence should occupy a place on the list of birds to be protected.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.

Arvicola riparius.
Arvicola pinetorum.
Blarina brevicauda.
Tamias striatus.
Sciurus hudsonicus.
Sciuropterus volucella.
Lepus sylvaticus.
Sitomys aureolus.
Sitomys americanus.
Evotomys gapperi.
Scalops aquaticus.
Synaptomys cooperi.
Mus decumanus.

BIRDS.

Bonasa umbellus.
Megascops asio.
Nyctala acadica.
Melanerpes carolinus.
Passerella iliaca.

In the South the eggs are deposited late in February or the first week in March, while in the North their deposition is a month or six weeks later.

The following extract from an article by 'J. M. W.' (Calvin Rawson), of Norwich, shows that it sometimes breeds in February as far north as Connecticut: "During the open Februarys, several years ago, Mr. Brand and myself took eggs in winter; but of late the last of March sees full clutches of this bird. I have seen eggs on a solid cake of ice, in a hole, and in open nests, with a foot of snow in the woods." (Ornithologist and Oologist, vol. XIII, 1888, p. 37.)

The ovaries in some of the birds captured in southern New York about the first of April were still in an undeveloped state, while other birds had deposited eggs. It thus appears that in the same locality the pairs do not all breed at the same time.

The nest, like that of the Great Horned Owl, is situated indiscriminately in hollows or among the branches of trees. In the North a nest among the branches is more common and, although the structure may occasionally be made by the bird, the remodeled nest of the crow or hawk is more often used. It is not to be understood that the use of cavities in the North is at all uncommon, for probably a third of the nests are so situated, while in the South an open nest is rare. This species shows great fondness for a favorite nesting site, which it will occupy year after year even though it be habitually robbed of its eggs. The eggs are usually two or three in number, although sets of four and five have been taken.

This Owl is a lover of deep, dark woods, where it spends most of the day in quiet among the thick foliage. Heavy wooded swamps, with their luxuriant growth and festoons of vines, or the stately hemlock forests are the places preëminently suited to the bird's taste.

It is the commonest species of rapacious bird throughout the extensive swamps covered by cypress and other growths which abound in the coast region of the South, where as many as fifteen or twenty may be seen in a day's tramp. Although not usually seen near habitations, it sometimes wanders into large towns, either in search of food or the shelter afforded by some attractive clump of evergreens.

Mr. F. H. Carpenter makes the interesting statement that in the vicinity of Kingfield, Me., this Owl often resorts to barns during the day time and is known locally as "Barn Owl." (Ornithologist and Oologist, vol. XI, 1886, p. 177.)

When kept in captivity it soon becomes tame, especially when taken young, and makes a gentle and interesting pet, soon learning to know its master and to greet his coming with signs of affection and pleasure.

This Owl, like others of the family, generally remains quiet during the brightest part of the day. This habit is from choice and is not due to any defect in its vision. The familiar instances cited in books, where is has been known to alight on a collector's gun barrel or the back of a cow, are not evidences of defective vision, but merely show that the bird was preoccupied or had its eyes fastened on some object of unusual interest. A hawk has been known to follow a chicken into the house and attack it under a chair occupied by a person; yet no one will argue that the hawk was unable to see the individual. Mr. Frank Bolles found that his pet Barred Owls could not see in an ordinary degree of darkness, and thinks they sleep at night. (Auk, vol. VII, 1890, p. 106.)

Although usually quiet, it evidently does some hunting during the day, especially during the breeding season. Once on a bright afternoon in May, near Lake Pontchartrain, Louisiana, the writer saw one of these Owls flying over a protection levee to a swamp on the opposite side. It carried in its talons a bird, presumably a grackle, judging from the number of these birds which followed in hot pursuit and attacked it evidently in the hope of liberating their unfortunate comrade. This black and irritated mass followed the Owl into the swamp beyond, from which their scoldings could be heard for some time.

The hearing of the Barred Owl, like all other species, is very acute. On one occasion the writer was standing near a large tree in a dense swamp in the vicinity of Mobile, attempting to attract a small bird by the aid of a low squeaking noise. Through the foliage, some 50 yards or more distant, a pair of large birds were seen winging their way, and as the noise was continued they alighted within a few feet of its source, but on the opposite side of the tree. Great was their surprise to see a head

cautiously appear from behind the trunk, and after a few bewildered glances they beat a precipitate retreat, doubtless very much chagrined at the deception.

This is one of the most noisy of the Owls, and probably is oftener heard than any other. This is particularly true in the mating season, at which time, in localities where it is abundant, the woods resound with its weird but not unpleasant notes from early dusk to morn, and even at intervals during the day. At no time of the year is it altogether quiet, though during the period the young are being cared for it is seldom heard. Years ago in the months of October and November, while camping in the Adirondack wilderness in northern New York, one or more of these birds were heard nearly every evening, and a few times during the day. On one occasion, by imitating their notes, Dr. C. Hart Merriam brought two or three in close proximity to the camp, but we were unable to secure specimens on account of the darkness.

The flight is light, easy, rapid, and, as with other Owls, noiseless.

DESCRIPTION.

Large size. No ear tufts. General color deep umber-brown and buffy whitish. The plumage everywhere barred transversely except on the belly, where the stripes run lengthwise; bill yellow; eyes brown-black.

Length: 19 to 24 inches (482 to 610^{mm}); extent about 46 inches (1168^{mm}); wing 12.50 to 14 inches (317 to 355^{mm}); tail 9 to 10 inches (228 to 254^{mm}).

Table showing the results of examinations of 109 stomachs of the Barred Owl (Syrnium nebulosum).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Englewood, N. J.	Feb. 22, 1886			Meadow mouse.	
Alfred Center, N. Y.	Oct. 22, 1886			Red squirrel.	
Whitewater, Wis.	Aug. 30, 1886				Empty.
Washington, D. C.	Feb. 15 1887				Do.
Do	Mar. 16, 1887			Shrew	Frog, 8 larvæ.
Greensboro, Ala.	Nov. 15, 1887				Spider, grasshoppers, crickets.
Moose River, N. Y.	June 10, 1878			12 red-backed mice.	
Sing Sing, N. Y.	Nov. 27, 1882	Fowl			
Do	Jan. 21, 1885			2 meadow mice.	
Do	Mar. 21, 1885		Saw-whet owl		
St. Louis, Mo.	Spring, 1885		Screech owl.		
Eubank, Ky.	Mar. 21, 1887			Meadow mice, rabbit.	
Greensboro, Ala.	Nov. 12, 1887				Empty.
Sandy Spring, Md.	Apr. 25, 1887				Crawfish.
Do	Nov. 14, 1887			4 meadow mice.	
Do	Nov. 28, 1887		Screech owl.		
Do	Feb. 11, 1888				Empty.
Do	Feb. 18, 1888			Meadow mouse.	
Do	Feb. 19, 1888			Rabbit.	
Chester County, Pa.	Dec. 10, 1886			Flying squirrel.	
Do	Dec. 16, 1886			Rabbit.	

Table showing the results of examinations of 109 stomachs of the Barred Owl (Syrnium nebulosum)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester County, Pa				Mice	
Do	Jan. —, 1889			do	
	Jan. 17, 1881			do	
Elmira, N. Y	Aug. 1, 1885				Frog, crawfish.
Do	Aug. 7, 1886			Several mice	
Waverly, N. Y	Sept. 4, 1887			Mice	Insects.
Barton, N. Y	Oct. 17, 1886			Field mice	
Halsey Valley, N. Y	Oct. 5, 1887				Fish, insects.
Elmira, N. Y	Nov. 4, 1884			Mice	
Tyrone, N. Y	Nov. 13, 1887				Empty.
Elmira, N. Y	Dec. 1, 1886			Weasel	
Caton, N. Y	Jan. 1, 1885			Mice	
Tioga, N. Y	Feb. 9, 1886			Field mouse, mole.	
Elmira, N. Y	Feb. 19, 1887		Small birds		
Do	Mar. 3, 1886			Field mice	
Alexandria, Va	Apr. 17, 1888				Do.
Gainsville, Fla	Apr. 20, 1887				Frog, crawfish, Grasshoppers, larvæ, beetle.
Do	May 9, 1887				Lizard.
Do	Dec. 29, 1887			Mouse	
Do	Feb. 19, 1888			do	
Newtown, Conn	Oct. 23, 1880		Sparrow		
Englewood, N. J	Feb. 26, 1886			2 mice	
St. Helena Island, S. C.	Apr. 15, 1885			Rabbit	
Maplewood, N. J	———, 1882				3 fish, 1 frog.
Do					Crawfish.
Story County, Iowa	Nov. 8, 1883				Do.
Raleigh, N. C	Feb. 7, 1887				Do.
Do	Feb. 15, 1887				Empty.
Do	Apr. 21, 1887				Do.
Do	Sept. 1, 1887				Beetles.
Do	Apr. 9, 1888				Empty.
Saratoga County, N. Y	Dec. 19, 1886			Mice	
Washington County, N. Y.	Nov. 13, 1880				Crawfish, grasshoppers.
Troy, N. Y	Apr. 14, 1879		Screech owl		
Rensselaer County, N. Y.	Feb. 9, 1883				Empty.
Do	Nov. 28, 1884			Mouse	
Do	Aug. 21, 1886			Mice	
Do	Oct. 19, 1886				Do.
Do	Oct. 30, 1886			Squirrel, mice	
Do	Nov. 30, 1886				Do.
Do	Mar. 10, 1887			3 meadow mice	
Do	Mar. 22, 1887				Do.
Do	Oc. 16, 1888			Red squirrel	
Do	Dec. 15, 1888			Squirrel, mice	
Sandy Spring, Md	May 19, 1888				Do.
East Hartford, Conn	Oct. 31, 1887				Do.
Do	Apr. 20, 1888			Meadow mouse	
Sandy Spring, Md	June 3, 1888			Pine mouse	
Woodville, Minn	Apr. 6, 1888		Fox sparrow	Meadow mouse, red-backed mouse.	
Do	Apr. 16, 1888			3 meadow mice	
Virginia	Oct. 21, 1888				Crawfish.
Washington, D. C	Nov. 30, 1888			2 meadow mice	2 crawfish.
Sandy Spring, Md	Dec. 9, 1888				Grasshopper remains.
Gettysburg, Pa	Jan. 7, 1889	Pigeon.			
Sandy Spring, Md	Jan. 12, 1889			Meadow mouse	
Do	do			Meadow mouse, mole.	
Washington, D. C	Jan. 22, 1889	Fowl			
Hale County, Ala	Oct. 18, 1889				3 white grubs, cricket, 4 spiders.
Alfred Center, N. Y	Oct. 11, 1889			Cooper's mouse	
Cincinnati, Ohio	Nov. 11, 1884		Screech owl		
Do	Nov. 30, 1884			Mice	
Do	Jan. 16, 1885			do	
Do	do		Red-bellied woodpecker.		
Adams, Ind	Jan. 18, 1887			Meadow mouse	
Brookville, Ind	Dec. 15, 1887			White-footed mouse.	
Kalamazoo, Mich	Oct. 1, 1886		Sparrow		

Table showing the results of examinations of 109 stomachs of the Barred Owl (Syrnium nebulosum)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Kalamazoo, Mich	Oct. 17, 1886			Red squirrel	
——, Fla	Summer, 1880		Small birds	Mice	
Stratford, Conn	Dec. 18, 1888		Screech owl	Mole	
Toronto, Ontario	Jan. 24, 1890			Rat	
Do	Jan. 29, 1890			2 meadow mice	
Sandy Spring, Md	April 23, 1890				Snail, beetle.
Orange County, N. Y	Oct. 23, 1876				Empty.
Bay St. Louis, Miss	Aug. 30, 1890				Beetle remains.
Sandy Spring, Md	Nov. 6, 1890			2 meadow mice	Beetle.
Portland, Conn	Oct. 16, 1890			2 meadow mice, 1 white-footed mouse.	
Do	Oct. 18, 1890				Larva.
Do	Oct. 25, 1890			3 meadow mice, 1 rat.	
Do	Nov. 1, 1890				Empty.
Sandy Spring, Md	Nov. 30, 1890		Screech owl	Meadow mouse.	
Do	do			2 meadow mice	
Morristown, N. J	Oct. 4, 1890			Short-tailed shrew.	
Do	Nov. 4, 1890	Fowl		do	
Do	Nov. 17, 1890	Ruffed grouse.			
Columbus, Ohio	Oct. 1, 1890			Chipmunk	2 snails, 1 beetle.
Easton, Md	Feb. 22, 1891			Meadow mouse	
Lancaster County, Pa.	Nov. 30, 1890				Empty.
Meriden, Conn	Mch. 20, 1891				Do.
Washington, D. C	April 5, 1892				Do.

SUMMARY.—Of 109 stomachs examined, 5 contained poultry or game; 13, other birds; 46, mice; 18, other mammals; 4, frogs; 1, a lizard; 2, fish; 14, insects; 2, spiders; 9, crawfish, and 20 were empty.

SPOTTED OWL.

Syrnium occidentale.

The Spotted Owl, which may be considered a western representative of the Barred Owl, inhabits the highlands of Mexico, New Mexico, Arizona, Colorado, California, and Lower California. It was discovered by Xantus near Fort Tejon, Cal., March 6, 1858, and described by him in 1859 in the proceedings of the Academy of Natural Sciences, Philadelphia. Not until 1872 was the bird again met with, when Capt. Bendire found it in the southern part of Arizona, where on April 17, 1872, he found a nest and one egg, 9 miles west of Tucson. "The nest appears to have been built by the birds themselves. It was composed of small sticks and twigs and lined with dry grasses, pieces of bark, and a few feathers, placed close to the trunk of a large cottonwood tree, about 30 feet from the ground and easily seen from below. One of the parents was sitting on the nest and shot with a rifle after flying off, but not preserved. * * * The specimen sent to Mr. Ridgway was shot some time subsequently to my finding this nest, as I noticed on a critical examination of this bird that it differed from the Barred Owl in its markings." (Ornithologist and Oologist, vol. VII, 1882, p. 99.)

Mr. L. Belding secured a pair at Big Trees, Calaveras County, Cal., in the summer of 1880. He says: "Its call resembles the barking of a

dog, the first three or four notes lasting about one second each; these succeeded by long, harsh, whining notes."*

Mr. H. W. Henshaw took a specimen in the Upper Pecos region, N. Mex., August 20, 1883, but did not ascertain whether it bred or was common there. (Auk, vol. III, 1886, p. 79.)

Mr. A. W. Anthony secured a specimen in Colorado in January or February, 1882. "It was in a wet, marshy place grown up to coarse grass. The bird seemed to make its home in this locality for some time, as he says he flushed it from the grass on several different occasions during the winter before he succeeded in shooting it" (Auk, vol. III, 1886, p. 284).

As yet very little is known of the habits of this species and absolutely nothing of the food. It is to be presumed, however, that the latter is of much the same character as that of the Barred Owl.

DESCRIPTION.

Size, color, and form, much the same as the Barred Owl, but the barring on the head and back is broken up into round or irregular spotting. The belly is transversely barred much the same as the breast instead of being streaked as in the Barred Owl.

Length: 19 inches (482^{mm}); wing, 12 to 13.50 inches (305 to 342^{mm}); tail, about 9 inches (228^{mm}).

GREAT GRAY OWL.

Scotiaptex cinerea.

This large and handsome Owl is a boreal species, occurring in arctic and northern temperate America and migrating south in winter to the northern United States. A closely related geographical race (*Scotiaptex c. lapponicum*) inhabits the northern portions of Europe and Asia, straggling eastward to western Alaska. The Great Gray Owl is a very rare winter or accidental visitant as far south as the fortieth parallel, the limit of its wandering being reached in southern New England, New York, New Jersey, Ohio, and Illinois in the East, and northern California in the West. It is a common resident throughout all the wooded portions of Alaska, as it is in the Anderson River region and the fur countries generally.

The food seems to consist principally of hares, mice, and other of the smaller mammals as well as small birds. Whether it destroys many grouse or ptarmigans is not stated by authors who are most familiar with the bird. Dr. W. H. Dall took no less than thirteen skulls and other remains of red-poll linnets (*Acanthis*) from the crop of a single bird.

*Mr. F. Stephens secured an adult and young of this species at Smith Mountain, some 50 miles NNE. of San Diego Bay, California, June, 1892. (Auk., vol. IX, 1892, pp. 392–393.)

The following species of mammals were positively identified among the stomach contents: *Scapanus americanus*, *Arvicola riparius*, *Blarina brevicauda*, and *Sitomys americanus*.

Richardson found a nest on May 23 which contained three young. It was situated in a lofty balsam poplar and was composed of sticks, with a lining of feathers. The nest found by Mr. McFarlane on July 19, on the Anderson River, was placed in the top of a pine [spruce] about 20 feet from the ground and contained two eggs and two young. Probably the number of eggs in a set varies from three to five, and their deposition usually takes place some time in April.

Dr. Dall considers it a stupid bird and states that sometimes it may be caught in the hands. Its great predilection for thick woods, in which it dwells doubtless to the very limit of trees, prevents it from being an inhabitant of the barren grounds or other open country in the North. It is crepuscular or slightly nocturnal in the southern parts of its range, but in the high North it pursues its prey in the daytime. In the latter region, where the sun never passes below the horizon in summer, it is undoubtedly necessity and not choice that prompts it to be abroad in the daylight.

It is stated that the flight is heavy and somewhat labored, and has not the bouyancy noted in that of most of the Owls. This statement may result from the point of view of the observer, for it does not seem likely that its flight differs materially from that of the Barred Owl.

The note of this Owl is said to be a tremulous, vibrating sound, somewhat resembling that of the Screech Owl.

DESCRIPTION.

Largest of our Owls. No ear tufts. Wing, 16 to 18 inches (406 to 456^{mm}); bill, small, nearly hidden by feathers; eyes, yellow; general color, dusky grayish brown and grayish white.

Length: 25 to 30 inches (635 to 762^{mm}); extent, 54 to 60 inches (1370 to 1524^{mm}); wing, 16 to 18 inches (406 to 456^{mm}); tail, 11 to 12.5 inches (280 to 317^{mm}).

Table showing the results of examinations of 9 stomachs of the Great Gray Owl (Scotiaptex cinerea).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Carberry, Manitoba	Sept. 29, 1889	.....	.....	1 shrew.	
Lake Nipissing, Canada.	Oct. 29, 1889	.....	.....	4 meadow mice, 1 shrew.	
Haliburton, Ont	Dec. 20, 1889	.....	Snowbunting.	Short-tailed shrew.	
Muskoka, Ont	Dec. 27, 1889	.....	.....	3 meadow mice.	
Beavertown, Ont	Jan. 29, 1890	.....	.....	1 white-footed mouse, 4 meadow mice.	
Mt. Albert, Ont	Feb. 18, 1890	.....	.....	5 meadow mice.	
Dover, Maine	Mar. 8, 1890	.....	.....	Brewer's mole, meadow mouse.	
Elk River, Minn	Fall, 1889	.....	.....	3 meadow mice.	
Do	Jan. 5, 1890	.....	.....	5 meadow mice.	

SUMMARY.—Of 9 stomachs examined, 1 contained a small bird; 7, mice; and 4, other mammals.

RICHARDSON'S OWL.

Nyctala tengmalmi richardsoni.

Richardson's Owl is a boreal species inhabiting North America from the limit of trees south to the northern tier of States. It is merely a geographical race of Tengmalm's Owl, which inhabits the pine belt of the northern portion of the Eastern Hemisphere. Although the latter bird is said to breed in the Alps and Carpathians, it is accidental in the British Isles and is a rare winter visitant to Holland, Germany, and central Russia. It is extremely doubtful whether the American bird is ever other than a winter visitor within the limits of the United States. One or two specimens have been taken in winter as far south as Connecticut and Rhode Island, and on the west coast it is very rare as far south as Oregon. From this it will be seen that it differs materially from the more arctic Snowy Owl, which occasionally extends south in winter as far as the central United States.

The food, according to the published accounts, which are mostly general, consists of mice, insects, and small birds. In the vicinity of Fort Simpson, Mr. Ross stated that it produced sad havoc among the flocks of linnets. Mr. H. W. Wheelwright in Scandinavia one night shot a female in full chase of a lemming on a frozen lake. Undoubtedly, like the other small Owls, it feeds largely on small rodents and insects, and when these are scarce depends on small birds for sustenance.

It is common throughout northern Alaska wherever trees or large bushes occur to afford it shelter. It breeds in hollows of trees as well as in the deserted nests of other birds. It is very partial to the old holes of the pileated woodpecker (*Ceophlœus*), which seem to be just the size and shape to suit its fancy.

At the mouth of the Yukon, where there are no trees, Mr. E. W. Nelson says the eggs are deposited in old nests found in bushes. The eggs, which are from three to five in number, are deposited from the first of May to early in June, according to the latitude of the nesting ground.

Richardson's Owl is nocturnal in its habits, remaining quiet during the day in the thick foliage of the trees or bushes. In fact, its vision is apparently so affected by bright light that many specimens have been captured alive by persons walking up and taking them in their hands. On this account the Eskimo in Alaska have given it the name of 'blind one.'

The song of this Owl, according to Dr. Merriam (Bull. Nuttall Ornith. Club, vol. VII, 1882, p. 237), is a low, liquid note that resembles the sound produced by water slowly dropping from a height.

DESCRIPTION.

No ear-tufts; wings 6.50 inches (165^{mm}) or more; tail more than 4 inches (102^{mm}); legs and feet usually buffy, more or less spotted with brown; feathers covering under base of tail, striped with brown.

Length: 9 to 12 inches (228 to 305^{mm}); wing 6.60 to 7.40 inches (167 to 187^{mm}); tail 4.10 to 4.70 inches (103 to 119^{mm}).

SAW-WHET OWL.

Nyctala acadica.

The little Saw-whet, or Acadian Owl, inhabits temperate Canada and the northern United States, ranging south to about the thirty-ninth parallel in the east, and in the mountains to southern Mexico in the west. It breeds sparingly in Massachusetts and New York, and probably in suitable localities all across the continent to Oregon, north of the forty-second parallel of latitude. Occasionally it wanders south in winter as far as the Carolinas and Kentucky.

The food of this little Owl is composed almost entirely of mice, of which the wood-dwelling species seem to predominate. At times it attacks larger mammals, such as rats, half-grown red squirrels and chipmunks. The following, from Mr. George Lawrence Nicholas, is most extraordinary, as it hardly seems possible that so small a bird could swallow so large a morsel: "To-day, while hunting in a pine wood near this town [Summit, N. J.], I obtained an Acadian owl. Upon dissecting it I found that its stomach contained a flying squirrel, which had been swallowed whole and but slightly digested." (Forest and Stream, vol. XII, February 27, 1879, p. 67.)

It rarely molests small birds, unless its favorite food—mice—for some reason, is scarce. Occasionally it feeds on scraps of raw or cooked meat, which it has been observed to pick up in the vicinity of camps, and in winter, in the north, it will feed on the carcasses of comparatively large animals. Dr. Merriam mentions the following, which occurred at Point de Monts, Canada: "In winter Mr. Comeau once saw one of these little owls fly from within the carcass of a great northern hare that had been caught in a snare. The owl had eaten away the abdomen and was at work within the thoracic cavity when frightened away." (Bull. Nuttall Ornith. Club, vol. VII, 1882, p. 237.)

It also feeds to some extent on insects of various kinds. Thus it will be seen that while the diminutive size of the Saw-whet limits its power of usefulness, its mode of life renders it a useful adjunct to the farmer, and, small though it be, yet in districts where it abounds the number of mice it annually destroys must be very large.

Mr. Brewster gives an interesting account of the operation of disgorging the pellets which he observed in a young specimen in his possession: "The owl would gape several times, then the head would be violently shaken sideways, and finally the pellet, coated with mucous, would shoot forth, frequently falling several inches in front of the spot where the bird was sitting. After it was all over the little fellow assumed an expression of relief and contentment which was very comical." (Bull. Nuttall Ornith. Club, vol. VII, 1882, p. 24.)

The following species of mammals were positively identified among the stomach contents: *Arvicola riparius*, *Sitomys americanus*, *Sitomys a. sonoriensis*, *Sorex*, *and Mus musculus*.

The eggs are generally deposited in the hollows of trees, the deserted burrows of woodpeckers being the favorite place, though open nests are sometimes used for the purpose. Mr. W. Perham, of Tyngsboro, Mass., was very successful in inducing this Owl to build in nests which he put up in different parts of the forest. These 'nests' were sections of hollow limbs closed at the ends, with an entrance hole made in the side. As a rule this species uses no other nesting material than the rotten chips found in the cavities, or such accidental material as has been dragged in by squirrels or mice.

The number of eggs is from four to seven, and it would seem from Mr. Egbert Bagg's experience in central New York, that the larger number is more common. They are usually deposited by the first week in April, at which time full sets are found. A set of eggs taken by Mr. Egbert Bagg on April 7, 1886, in Oneida County, N. Y., were in different stages of incubation, proving that the female had remained on the eggs from the time the first egg was deposited. Unlike the little Screech Owl, this species is very apt to leave the nesting cavity when the tree is shaken or jarred during the ascent to it.

The species is not migratory, but is more or less of an irregular wanderer in its search for food during the fall and winter. It may be quite common in a locality and then not be seen again for several years. It is nocturnal, seldom moving about in the daytime, but passing the time in sleeping in some dark retreat. So soundly does it sleep that often times it may be captured alive, as in the following case cited by Mr. Ridgway: "But a single individual of this pretty little Owl was met with; this one was captured alive by Mr. O. L. Palmer, of our party, who found it asleep and placed his hat over it. It was perched on the edge of an old Robin's nest, in a dense willow thicket near camp." (U. S. Geol. Explor. of the Fortieth Parallel, King, vol. IV, 1877, p. 572.)

During the day it frequents the thick evergreen woods, though sometimes it is found in comparatively open groves, but always in dense trees. Mr. W. E. D. Scott found it common in scattered cedar groves at Princeton, N. J., in December 1878, when he obtained seventeen specimens in two days; while in January, which was colder, he met with more in hollow trees. (Bull. Nuttall Ornith. Club, vol. IV., 1879, p. 85.) In the Dead River region, Maine, on January 7, Mr. F. H. Carpenter found three sitting close together on a joist on a grain shed of a lumber camp. (Ornithologist and Oologist, vol. XI, 1886, p. 177).

The mortality which sometimes occurs among this species in winter is difficult to account for. Specimens which show no signs of violence, though somewhat emaciated, are found on barn floors, under trees, or along fences. That cold has anything to do with killing this hardy little Owl is not to be supposed, for such accidents occur more often towards the southern limit of its range; and why should it starve in localities where food abounds, as about Washington, where most of the specimens secured have been picked up dead?

This little Owl is mild and gentle in disposition while in captivity and makes an interesting pet. It will soon allow itself to be handled, and is particularly fond of having its head gently scratched.

Although seldom known to hunt during the daytime, there are exceptions, as in the case occurring near Washington, D. C., where Mr. J. D. Figgins killed a specimen which was feeding on a junco and surrounded by a mob of small birds. (Auk, vol. VI, 1889, p. 189.)

The note of this species is peculiar and has a rasping character, resembling the sound made when a large-toothed saw is being filed; hence the name. It is more often heard during March and early April, though occasionally it is heard at other times of the year.

The flight resembles that of the woodcock very closely, so much so in fact, that the writer once killed a specimen as it was flying over the alders, and not until the dog pointed the dead bird was he aware of his mistake.

DESCRIPTION.

Smallest Owl of the eastern United States; no ear tufts; wing less than 6 inches (152^{mm}); tail less than 3.50 inches (88^{mm}); above, brown, more or less spotted with white; beneath white, striped with reddish brown.

Length: 7.25 to 8.50 inches (183 to 215^{mm}); wing, 5.25 to 5.90 inches (133 to 149^{mm}); tail, 2.80 to 3.25 inches (70 to 82^{mm}).

Table showing the results of examinations of 22 stomachs of the Saw-whet Owl (Nyctala acadica).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Taunton, Mass	Dec. 11, 1885			Mouse hair	
East Hartford, Conn	Jan. 7, 1887			White-footed mouse.	
Hillsboro, N. B	Oct. 21, 1886			Mouse hair	
Flatbush, N. Y	Nov. 3, 1887			House mouse	
Locust Grove, N. Y	Jan. 24, 1884			Meadow mouse	
Sing Sing, N. Y	Jan. 13, 1885			do	
District of Columbia	Mar. 12, 1889		Sparrow		
Do	Nov. 1, 1889				Empty.
Do	do				Do.
Story County, Iowa	Dec. —, 1882			Mouse	
Do	Dec. —, 1882			do	
Do	Jan. 8, 1883			do	
Do	Oct. —, 1883			do	
Rensselaer County, N. Y.	Jan. 31, 1887			Mice	
San Francisco, Mountain, Arizona.	June 12, 1887			Meadow mice, white-footed mice.	
Do	do			do	
Do	do			do	
Do	do			do	
New Haven, Conn	Nov. 14, 1890				Moth.
Brookland, D. C	Dec. 12, 1890			Meadow mouse	
Horse Hill, N. J	Oct. 29, 1890			Small shrew, white-footed mouse.	
Wilmington, Mass	Feb. 19, 1892				Empty.

SUMMARY.—Of 22 stomachs examined, 17 contained mice; 1, a bird; 1, an insect; and 3 were empty.

SCREECH OWL.

Megascops asio.

[Plate 23—Red and gray phases.]

The little Screech Owls are distributed over the temperate parts of the globe and are among the better known of the Owls.

The Common Screech Owl is distributed throughout the whole of the United States and the southern portions of the British provinces. It is separable into several geographic races, as is usual in species having such an extensive distribution. The typical form (*Megascops asio*) ranges from the eastern United States and the British provinces south to about the thirty-second parallel and west to the Great Plains. The Florida Screech Owl (*Megascops asio floridanus*) inhabits the Gulf States from Louisiana to Florida and extends north along the coast to South Carolina. The Texas Screech Owl (*Megascops asio mccallii*) is found in southern Texas and eastern Mexico southward to Guatemala. The Mexican Screech Owl (*Megascops asio trichopsis*) inhabits northwestern Mexico, Lower California, Arizona, and New Mexico. The California Screech Owl (*Megascops asio bendirei*) is limited to California. Kennicott's Screech Owl (*Megascops asio kennicottii*) inhabits the Northwest coast, from Oregon to Sitka, and east to northern Montana.* The Rocky Mountain Screech Owl (*Megascops asio maxwelliæ*) is found in the Rocky Mountains, from Colorado to eastern Montana.

Their food consists of a great variety of animal life, including mammals, birds, reptiles, batrachians, fish, crustaceans, and insects. At night-fall they begin their rounds, inspecting the vicinity of farm-houses, barns, and corncribs, making trips through the orchard and nurseries, gliding silently across the meadows or encircling the stacks of grain in search of mice and insects. Thousands upon thousands of mice of different kinds thus fall victims to their industry. Their economic relations therefore are of the greatest importance, particularly on account of the abundance of the species in many of the farming districts, and whoever destroys them through ignorance or prejudice should be severely condemned.

Those who have rambled much in the country in the clear winter mornings must have noticed the tracks of mice which often form networks in the snow, crossing and recrossing, passing in and out of walls and stacks, or converging toward some choice bit of food—all tend-

* Mr. William Brewster (Auk, vol. VIII, 1891, pp. 140–144) divided this race into three subspecies. Typical *kennicottii* inhabiting the coast of Alaska from Sitka southward; *macfarlanei*, Fort Walla Walla, Washington, Hellgate, Montana, and probably the entire intermediate region, northward into the interior of British Columbia; and *saturatus*, the shores and islands of Puget Sound, ranging southward along the coast to Salem, Oregon. In the same paper (on page 139), a new race, *aikeni*, is described from El Paso County, Colorado.

ing to show how active these little rodents are during the night, a period when most of the world sleeps. Occasionally a track stops abrubtly, and while the observer is trying to read more of the history written in the snow, his eyes catch the faint impression of a pair of wing tips near where the trail ends, and instantly he recognizes that a tragedy has been enacted. Beside the different species of mice, the Screech Owl feeds on other small mammals, such as chipmunks, shrews, moles, and occasionally bats. During warm spells in winter it forages quite extensively and stores up in its home considerable quantities of food for use during inclement weather. It may be said in this connection that with one exception the only specimens of pine mice procured by the writer in southern New York were taken from the storehouses of this Owl.

Frogs are devoured greedily, while other batrachians and small reptiles are occasionally eaten. Crawfish are sometimes found among the stomach contents, but not so often as in the case of the Barred Owl. Evidence goes to show that at times this Owl is an expert fisherman. Capt. Charles E. Bendire found it feeding on fish in the Northwest, and the following note by Mr. M. A. Frazar, from Watertown, Mass., shows that it will sometimes travel a long distance for this food:

"On November 29, 1876, I took from a Mottled Owl's hole (*Scops asio*) the hinder half of a Woodcock (*Philohela minor*). Within two weeks after I took two Owls from the same hole, and on the 19th of January last I had the good fortune to take another. After extracting the Owl I put in my hand to see what else there was of interest, and found sixteen Horned Pouts (*Amiurus atrarius*), four of which were alive. When it occurred to me that all the ponds in the vicinity were under at least 2 feet of snow and ice, I could scarcely conjecture where the Horned Pouts could have been captured. After visiting all the ponds I found they had most probably been captured in one fully a mile away, where some boys had been cutting holes through the ice to catch pickerel bait. The Owl probably stationed himself by the edge of the hole and seized the fish as they came to the surface. What a busy time he must have had flying 32 miles after sixteen Horned Pouts." (Bull. Nutt. Ornith. Club, vol. II, July, 1877, p. 80.)

Mr. Willard E. Treat, of East Hartford, Conn., speaking of this habit, says: "I secured a Screech Owl February 2, 1889, which was caught in a steel trap, the latter having been set in a spring where there were a number of small fish. When found it was dead, having been drowned, and its legs were more or less covered with fish scales. The trap was at least 4 or 5 inches below the surface of the water, which seems to show that the Owl must have plunged into the water in order to have got caught. This is the only instance in which I have known this species to enter the water for the purpose of securing fish." (Auk, vol. VI, 1889, p. 189–190.)

No Owl except the Burrowing Owl is so destructive to noxious insects as this species, it devouring with relish grasshoppers, crickets, and a number of night-flying beetles. The stomachs of two young birds which had recently left the nest were found distended with May beetles. Prof. Samuel Aughey found remains of insects in all the specimens he examined in Nebraska, and states: "It is largely an insect-eating bird." Dr. B. H. Warren says: "During the summer months and at other times when insect life is abundant the Screech Owls subsist mainly on an insect diet." (Birds of Pennsylvania, 1888, p. 115.) During the years 1884 and 1885 Mr. Charles Dury received at least sixteen specimens from the vicinity of Cincinnati; twelve of these, including one killed in January, contained remains of insects.

Writers almost universally speak of the Screech Owl as a beneficial species:

"It preys on mice, small sparrows, etc., and very often catches nocturnal beetles and other insects. It thus destroys a large number of field mice and the large cockchafer, so injurious to our fruit trees. In winter it familiarly enters our barns and outhouses, where it becomes an expert and industrious mouser." (Dr. E. Michener, U. S. Agricultural Report, 1863, pp. 291–292.)

"The food is chiefly small quadrupeds, insects, and occasionally, when they have young, small birds. They destroy a vast number of mice, beetles, and vermin, and are of great service to the agriculturist." (Baird, Brewer & Ridgway, History of North American Birds, vol. III, p. 57.)

"After dark it is all alive; not a mouse can stir without being observed, and so quick and noiseless is the flight of the bird that few escape which expose themselves." (McIlwraith, Birds of Ontario, 1886, p. 158.)

"A large number of castings of this species were examined on various occasions, and found to be composed almost entirely of the fur and bones of meadow and white-footed mice; with feathers of bluebird and some sparrow in several cases; and sometimes insects." (Mr. J. Percy Moore, *in epist.*)

Mr. George C. Jones, writing from Brookfield Center, Fairfield County, Conn., says: "I think the smaller species of Owls feed upon the cutworm to some extent. I have found cutworms in the stomach of the common Screech Owl and in the Long-eared Owl. The fact that both the cutworms and the Owls are nocturnal leads me to believe that the Owls, of all the birds, are the most efficient exterminators of this formidable pest and should, on this account receive protection. "The farmers here are large growers of tobacco, and the damage done by the cutworm to the young plants and the labor of resetting forced upon the growers is almost incalculable. I believe that if our native Owls were as plenty as some other species of birds the ravages of this destructive worm would be much less than at present."

Unfortunately we can not shut our eyes to the blacker pages of its history, and it must be said that occasionally it is destructive to small birds, especially during the breeding season, when it has a number of hungry mouths to fill, and also in suburban districts where its favorite food is hard to procure. Mr. Morris M. Green found the remains of a house wren in a hole containing five young Screech Owls; and Nuttall says: "In the hollow stump of an apple tree, which contained a brood of these young owls, were found several bluebirds, blackbirds, and song sparrows, intended as a supply." (Land Birds, 1832, p. 121.)

Sometimes it kills birds fully as large as itself. In one of its holes the writer once found the remains of a quail; and a woodcock has been mentioned as found in a similar situation. Mr. R. E. Kimball, of Fitchburg, Mass., informed the writer that a Screech Owl was killed at Lunenburg, near that place, January 27, 1890, which had killed thirteen doves for one farmer before it was itself executed. Its stomach was filled with the feathers of the last victim. In a few instances it has been known to kill and eat one of its own kind. When suffering from the pangs of hunger it occasionally attacks barn-yard fowls.

"About 3 o'clock on last Friday afternoon a common little screech owl flew into a large barnyard in this neighborhood and alighted on the back of a large hen, several times as large as itself, attempting to carry it off. The claws of the owl got entangled in the feathers of the frightened hen, and the owner of the farm was enabled to catch it. * * * There was scarcely any flesh on its bones and no signs of food in its stomach." ('Night Hawk': Forest and Stream, vol. xx, March 8, 1883, p. 106.) And Mr. J. L. Davison, of Lockport, N. Y., mentions a Screech Owl attacking a Plymouth Rock rooster. (Forest and Stream, vol. xxiv, March 19, 1885, p. 145.)

Unfortunate as this bird-catching habit seems to be, it may be ranked as an important factor in the bird's favor. Since the introduction of the noxious English sparrow, and its alarming increase in our cities and villages, experience has taught the little Screech Owl that this sparrow is a delicate and easily obtainable food. Many times at dusk has this Owl been seen hovering about the ivy-mantled churches or thick shrubbery of the parks in search of sparrows, and still more positive evidence is furnished by the remains of English sparrows which have been found in the stomachs of Owls shot in such localities.

On this subject, Mr. R. S. T. Russell, of Mount Perry, Ohio, writes to us as follows: "I want to send you a fact about the English sparrow. Last summer they were so thick around my house as to almost set me wild, when a little 'screech' owl got to visiting us every night, and at each visit he carried off a sparrow. My house is thickly covered with vines, and the little owl would make a dash into the vines and capture his sparrow every time. By fall they were well thinned out."

The following species of mammals and birds have been positively identified among the stomach contents:

MAMMALS.	BIRDS.
Sitomys americanus.	*Colinus virginianus.*
Sitomys eremicus.	*Megascops asio.*
Arvicola austerus.	*Otocoris a. praticola.*
Arvicola pinetorum.	*Junco hyemalis.*
Arvicola riparius.	*Ammodramus s. savanna.*
Mus musculus.	*Spizella monticola.*
Sciuropterus volucella.	*Spizella socialis.*
Tamias striatus.	*Melospiza georgiana.*
Perognathus.	*Melospiza fasciata.*
Neotoma floridana.	*Passer domesticus.*
Scalops aquaticus.	*Seiurus motacilla.*
Condylura cristata.	*Troglodytes aëdon.*

This Owl breeds throughout its range, and does not migrate or even wander far during the winter months. It almost invariably nests in the hollows of trees, usually not over 10 feet from the ground, old apple orchards being favorite resorts in thickly inhabited sections. Occasionally it has been known to breed in holes in buildings as well as in dovecotes, but never in nests among the branches of trees, as is the habit of some other Owls. Capt. Bendire once found a pair breeding near Fort Walla Walla in the same tree with a pair of Sparrow Hawks, and there seemed to be perfect harmony between the birds, although their holes were only about 2 feet apart. (Ornithologist and Oologist, vol. VI, 1881, p. 21.)

In the following case, noted by Mr. F. Stephens, the relations of the species were somewhat strained. Mr. Stephens states: "On April 19 I heard a screaming noise proceeding from a woodpecker's hole in a pine. I climbed the tree and pulled out a female McCall's Owl, and immediately after a male Sparrow Hawk flew out. The Owl was apparently breeding, but the hole contained no eggs." (Bull. Nuttall Ornith. Club, vol. III, 1878, p. 94.) Evidently the Hawk had been looking for a nesting site and had entered a tenanted one by mistake.

There never seems to be much of an attempt to form a nest; usually the cavity is incompletely lined with a few feathers from the parent bird, but this is by no means universal. The eggs, from three to six in number, are placed in the bottom of the cavity in the rotten wood and other material accidentally occurring there. In the South they are deposited in the latter part of March, while in the more northern States full sets are rarely found before the middle of April. If the cavity is large enough the male usually remains with the female during the day while she is sitting on the eggs; if it is not of sufficient size to accommodate both, he may be found in a neighboring hole or copse. About one month elapses from the time the first egg is deposited until all the young hatch, and they remain in the nest about the

same length of time. Mr. F. H. Carpenter had a pair breed in confinement and gives the length of incubation as twenty-two days. (Ornithologist and Oologist, vol. VIII, 1883, pp. 93, 94.) In the latter part of May or first of June families composed of old and young sometimes may be started at dusk from the clumps of bushes bordering streams, or in the vicinity of old orchards.

The little Screech Owl is one of the most nocturnal of our species, seldom moving out of its retreat until twilight. Its flight is regular, and when indistinctly seen in the dusk it much resembles that of the woodcock. If suddenly started on a bright day it flies around in a bewildered manner, but soon becomes accustomed to the light and apparently sees perfectly well. During the day it usually remains hidden in the hollows of trees or more rarely among the thick foliage. Here it is occasionally espied by some keen-eyed songster prying in every nook and corner while in search of food. The little bird is not slow in making its discovery known to others in the neighborhood, who at the first note of alarm hurry to the spot. Soon an irritated mob, including perhaps a dozen species, surround poor *Megascops* and make life so uncomfortable that he is forced to seek another place, only to be followed and harassed by his tormentors. To escape these frequent indignities he chooses the dark cavities in hollow trees in preference to other and less secure hiding places.

During cold weather in the north it not unfrequently inhabits barns. Mr. McIlwraith, of Hamilton, Canada, states: "During some winters there is scarcely a farm in the country which has not its Screech Owl in the barn." (Birds of Ontario, 1886, p. 157.)

When kept in confinement the Screech Owl is one of the most interesting of pets, and although not so active on bright days as might be desired, it is usually so kind and affectionate as fully to compensate for its sluggishness. It soon learns to take food from the hand and will allow a moderate amount of handling by its master. It is very fond of water and will drink or bathe eagerly when a fresh supply is placed in the cage. Once about dusk the writer came upon a small family which had emerged the moment before from the water. They were sitting on some low alders over a shallow portion of the stream, ruffling up and shaking the water from their feathers, and presented a soaked and forlorn appearance. Apparently they were too wet to be able to fly well, for when approached they fluttered off heavily into the thicket and soon escaped from sight in the growing darkness. The number of times this Owl has been drowned in water barrels indicates its fondness for bathing. The following note by Mr. A. W. Anthony, of an incident in Washington County, Oregon, unquestionably refers to a bird caught while attempting to bathe: "One was caught in a steel trap set in a deep, narrow ditch. As the trap was sunk at least 4 inches under water, and was not baited, it is a puzzle to me how the bird was caught." (Auk, vol. III, 1886, p. 165.)

The low, wailing, moaning notes of this Owl are not loud, but their character enables them to be heard a considerable distance; they suggest, without resembling, those of the common dove. They may be heard at any time from dusk to dawn, and on rare occasions in the daytime.

DESCRIPTION.

Toes more or less distinctly feathered or bristled on upper side. Ear tufts conspicuous. Plumage presenting two totally distinct phases, having no relation to sex, age, or season; one grayish, the other bright rufous; though birds from the Rocky Mountains and the Pacific Slope, south of the northwest coast region, are known only in the gray plumage. A more or less conspicuous bright-colored stripe runs along each side of the back, and a blackish line along the shafts of the feathers, sometimes throwing out transverse bars.

Length: 6.50 to 10 inches (165 to 254^{mm}); extent, 20 to 24 inches (508 to 610^{mm}); wing, 5.60 to 7.10 inches (142 to 180^{mm}); tail, 3 to 3.70 inches (75 to 94^{mm}).

Table showing the results of examinations of 254 stomachs of the Screech Owl (Megascops asio).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sing Sing, N. Y.	Aug. 31, 1885				Remains of insects.
Atlanticville, N. Y.	Dec. 4, 1885			Mouse hair	
Sing Sing, N. Y.	Sept. 25, 1886				Do.
Washington, D. C.	Nov. —, 1886			Meadow mouse	
Do	do			2 white-footed mice.	Do.
Do	do				Do.
Do	do				Do.
Do	do			Mouse hair	Do.
Do	do		Tree sparrow		
Do	do				Do.
Do	do		Feathers		
Do	do			Mouse hair	
Do	do				Do.
River Vale, N. J	Nov. 20, 1885				Larvæ.
Bergen County, N. J.	Nov. 26, 1885			House mouse	
Alfred Center, N. Y.	Oct. 10, 1886			White-footed mouse.	Grasshopper, crickets, crawfish.
Peterboro, N. Y.	Sept. 11, 1886		Sparrow	do	Grasshoppers.
Amherst, Mass	July 8, 1886				Frog, remains of insects.
Cleveland, Ohio	Mar. 12, 1886			Meadow mouse.	
East Hartford, Conn.	June 23, 1886		3 small birds		7 beetles.
Gainesville, Fla.	Mar. 12, 1887				Grasshoppers, larvæ of beetles.
Washington, D. C.	Jan. —, 1887			White-footed mouse; meadow mouse.	
Do	do			2 meadow mice	
Do	do		Screech owl		
Do	do		do		
Do	Feb. 15, 1887			Mouse	
Rockville, Conn.	May 28, 1887				Empty.
Do	do				Beetle.
Portland, Conn.	Oct. 22, 1886				Spider.
Do	Dec. 23, 1886	Pigeon			
Lockport, N. Y.	Jan. 7, 1888				Crawfish.
Portland, Conn.	May 5, 1887				7 May beetles.
Washington, D. C.	Feb. 13, 1887			2 pine mice	
East Hartford, Conn.	July 16, 1886		2 English sparrows.		

Table showing the results of examinations of 254 stomachs of the Screech Owl (Megascops asio)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Philadelphia, Pa	Apr. 20, 1886				May beetles.
Greensboro, Ala					2 cicadæ.
Sandy Springs, Md	Mar. 2, 1887				Insects.
Do	....do			2 mice	
Chester County, Pa	Jan. 11, 1886			Mouse hair	
Do	Jan. 5, 1886			House mouse	
Do	Apr. 22, 1886		Feather		Beetle.
Do	Jan. 7, 1887		Feathers		
Do	Jan. 8, 1887			House mouse	
Do	Nov. 10, 1887			Meadow mouse	
Do	1876			Meadow mouse, house mouse.	
Do	Nov. 27, 1886			White-footed mouse.	
Do	....do				Empty.
Do	Dec. 6, 1886			Meadow mouse.	
Do	Dec. 10, 1886				Beetles.
Do	....do				Empty.
Do	Feb. 12, 1887				Indeterminate matter.
Do	Feb. 9, 1887			House mouse	
Do	Feb. 18, 1887			....do	
Do	Jan. 15, 1887			....do	
Do	Jan. 17, 1887			....do	
Do	Dec. 27, 1886			Mouse hair	
Do	Jan. 11, 1887			House mouse	
Do	Feb. 9, 1887				Trace insects.
Do	Feb. 10, 1887				Empty.
Do	Jan. 17, 1887			Mouse hair	
Do	Feb. 11, 1887				Do.
Do	June 7, 1884				Insects.
Do	Jan. 8, 1885				Do.
Do	Jan. 6, 1885				Do.
Do	Dec. 18, 1886		English sparrow	Mice	
Do	Nov. 17, 1880		Small bird	....do	
Do	Nov. 26, 1880			....do	
Do	Aug. 20, 1876				Grasshoppers.
Delaware County, Pa	Dec. 5, 1879			Mice	
Cedar County, Nebr	Sept. —, 1867				47 locusts, 12 other insects.
Do	....do		Small bird		32 locusts, 8 other insects.
Do	June —, 1868				41 locusts, 22 other insects.
Dakota County, Nebr	July —, 1869			Mouse	69 insects.
Do	Aug. —, 1870			....do	38 insects.
Seward County, Nebr	Sept. —, 1872				67 insects.
Nemaha County, Nebr	Sept. —, 1874				50 locusts, 16 other insects.
Lancaster Co., Nebr	June —, 1875				49 locusts, 15 other insects.
Elmira, N. Y	Jan. 29, 1886		English sparrow	Mice	
Do	Jan. 30, 1886		Feathers	....do	
Horseheads, N. Y	Feb. 4, 1886		English sparrow		
Chemung, N. Y	Mar. 7, 1886			Field mice	
Elmira, N. Y	Mar. 21, 1886			Mice (?)	
Barton, N. Y	Apr. 13, 1887		Junco		
Waverly, N. Y	Apr. 15, 1886				Insects.
Tioga, Pa	Oct. 5, 1886			Mice	
Wellsboro, Pa	Oct. 8, 1887		English sparrow		
Elmira, N. Y	Oct. 21, 1886		Shore lark		
Do	Oct. 23, 1886			Mice	
Do	Oct. 25, 1887		English sparrow		
Wellsburg, N. Y	Nov. 2, 1886				Empty.
Caton, N. Y	Dec. 24, 1887		English sparrow		
Washington, D. C	Mar. 25, 1888			Meadow mouse	Crawfish.
Do	....do				Empty.
West Chester, Pa	Jan. 6, 1887			House mouse	
Raleigh, N. C	Feb. 16, 1888				Do.
Do	Aug. 27, 1888		Water thrush		Insects.
Do	Aug. 29, 1888				Do.
Do	Aug. 30, 1888				Do.
Do	Nov. 3, 1888				Do.
Do	Dec. 7, 1888				Do.
Do	Mar. 20, 1889			Mice	
Tracy Station, Ind	Feb. 12, 1887				Empty.
Brookville Ind	Mar. 26, 1887			Shrew	
Adams, Ind	Dec. 10, 1887				3 crawfish, minnow.

Table showing the results of examinations of 254 stomachs of the Screech Owl (Megascops asio)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Brookville, Ind	Dec. 31, 1887				
Troy, N. Y	Nov. 1, 1883			Mouse	
Do	Dec. 6, 1883				Empty.
Rensselaer County, N. Y.	July 13, 1882				Large beetle.
Do	Dec. 9, 1884			Mice	
Do	May 25, 1886		Sparrow		
Do	April 3, 1887		Feathers		
Do	Nov. 1, 1887				Empty.
Do	June 8, 1888				Do.
Stratford, Conn	Jan. 15, 1889				Indeterminate matter.
Gaylordsville, Conn	Feb. 14, 1889		Feathers		
Gold Hill, Colo	Summer, 1889			Meadow mouse	Crawfish.
Do	....do				Crawfish, beetles.
Do	....do				Crawfish.
West Goshen, Pa	Oct. 31, 1886			Mouse	Beetles, grasshoppers.
Morristown, N. J	Dec. 10, 1885			Meadow mouse	
Do	Dec. 5, 1885			Mouse	
Do	Nov. 28, 1885			Meadow mouse	
Lookout Mountain, Tenn.	Mar. 20, 1882				Large beetles.
Fort Hamilton, Long Island, N. Y.	Dec. 11, 1881			Mouse	
Schraalenberg, N. J	Nov. 26, 1885			Mice	
Cincinnati, Ohio	Apr. 10, 1884				Beetles.
Do	May 22, 1884				Do.
Do	Oct. 10, 1884				Do.
Do	Nov. 8, 1884				Millipedes.
Do	Nov. 24, 1884				Insects.
Do	Dec. 5, 1884			Mice	
Do	Dec. 11, 1884			....do	
Do	Jan. 13, 1885				13 cutworms, millipedes.
Do	Jan. 25, 1885		English sparrow	Mice	
Raleigh, N. C	Jan. 18, 1886				Empty.
Do	Jan. 22, 1886		Feathers		Toad.
Do	Jan. 15, 1887				Beetle.
Do	Feb. 26, 1887				Insects.
Do	Feb. 16, 1888				Empty.
Washington, D. C	Apr. 29, 1888		Swamp sparrow	White-footed mouse.	Insects.
East Hartford, Conn	Nov. 3, 1887				Insect remains.
Do	Apr. 6, 1888			Mouse	
Washington, D. C	May 27, 1888				May beetles.
Do	....do		Small bird		Do.
Do	....do				Do.
Geneva, N. Y	Jan. 26, 1888				Empty.
East Hartford, Conn	Apr. 4, 1887				4 moths.
Do	Apr. 8, 1887		Feathers	Mouse	
Do	....do				Empty.
London, Nebr	Sept. 8, 1888				2 grasshoppers.
Gordon, Tex	Sept. 9, 1888				5 grasshoppers, beetle.
Do	....do				6 grasshoppers.
Sandy Spring, Md	Jan. 29, 1889				Empty.
Chester County, Pa	Mar. 1, 1889				Do.
Flatbush, N. Y	Jan. 13, 1889		Tree sparrow		
Oracle, Ariz	June 11, 1889				Do.
Do	....do				Insect remains.
Washington, D. C	June 2, 1889			Star-nosed mole	3 May beetles.
Do	....do				Grasshopper, cricket.
Do	....do				Tree toad, burying beetle, 5 lepidopterous larvæ, 4 grasshoppers, 1 hellgrammite.
Cold Spring, Suffolk County, N. Y.	May 19, 1889		Song sparrow	White-footed mouse.	Beetles.
Washington, D. C	Aug. 28, 1889				Grasshoppers, beetles.
Alfred Center, N. Y	Oct. 2, 1889			Flying squirrel	Grasshoppers.
Hale County, Ala	Nov. 13, 1889				2 beetles.
Vineland, N. J	Feb. 15, 1889			2 house mice	
Sandy Spring, Md	Jan. 19, 1890				Empty.

Table showing the results of examinations of 254 stomachs of the Screech Owl (Megascops asio)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Ercildoun, Pa	Dec. 25, 1889				Small insects.
Do	Feb. 14, 1889				Empty.
Selden, N. Y	Aug. 8, 1889			Meadow mouse.	
Glen Head, N. Y	Nov. 15, 1888				30 larvæ.
Huntington, N. Y	Nov. 25, 1889				Sand, vegetable matter.
Highland Falls, N. Y	Oct. 24, 1874				Empty.
Do	May 30, 1875				Do.
Do	June 1, 1875				Do.
Do	June 2, 1875				Do.
Do	Dec. 8, 1875			White-footed mice.	
Do	Dec. 27, 1880				Empty.
Do	Jan. 21, 1883				Do.
Do	Apr. 25, 1883				Do.
Do	May 14, 1883			Hair	Insect remains.
Camp Verde, Ariz	June 5, 1884			Hair of small mammals.	
Picacho Station, Ariz	May 9, 1885			Remains small mammals.	
Casa Grande, Ariz	May 10, 1885				Flesh.
Do	May 10, 1885				Do.
Picacho Station, Ariz	May 24, 1885			Remains small mammals.	
Do	May 26, 1886			Hair of small mammals.	
Camp Verde, Ariz	June 6, 1885				Empty.
Do	July 6, 1885				Grasshoppers.
Do	Apr. 27, 1886			Desert mice	
Do	Sept. 14, 1886				Empty.
Do	Nov. 28, 1886				Do.
Do	Oct. 12, 1887				Spiders. insects.
Washington, D. C	Aug. 10, 1890		Chipping sparrow.		
Do	....do				10 larvæ.
Plover Mills, Ontario	Sept. 29, 1884				2 crickets.
London, Ontario	Oct. 29. 1890			2 white-footed mice.	2 craw fish, 1 larva.
Portland, Conn	Oct. 10, 1890				Empty.
Oxford, Ohio	....do			1 meadow mouse, 2 house mice.	Beetles, grasshoppers.
Sandy Spring, Md	Nov. 16, 1890			Mouse	Insects.
Tanque Verde, Ariz	Mar. 30, 1890			....do	12 grasshoppers, 1 scorpion, beetle.
Do	....do		Bird	2 mice	8 grasshoppers.
Do	....do			Mouse	Lizard, scorpion, 10 grasshoppers, 2 beetles.
Washington, D. C	Nov. 27, 1890			Meadow mouse	
Sandy Spring, Md	Nov. 29, 1890			House mouse	
Morristown, N. J	Oct. 2, 1890				3 crickets, 2 katydids, earthworms, 2 larvæ.
Union County, Ky	May 19, 1890				Beetle.
Fairfax County, Va	Dec. 21, 1890		Swamp sparrow.	House mouse	
Do	....do			2 house mice	
Washington, D. C	Dec. 14, 1890			House mouse	
Morristown, N. J	Oct. 25, 1890				12 caterpillars, 1 earthworm, beetle, crawfish.
Do	Oct. 25, 1890				10 caterpillars, spider, grasshopper, 2 cave crickets.
Flatbush, N. Y	Mar. 23, 1890				Empty.
Selden, N. Y	Apr. 21, 1890				Do.
Do	....do				Do.
Sugar Grove, Ohio	Oct. 17, 1890				Beetle remains.
Brookland, D. C	May 28, 1891				20 May beetles, 1 spider, 2 caterpillars.
Buffalo, N. Y	Dec. 13, 1890				Empty.
Do	Jan. 26, 1891				Do.
Do	Aug. 6, 1890			2 meadow mice	
Do	Dec. 13, 1890				Do.

DWARF SCREECH OWL

Megascops flammeolus idahoensis Merriam

Table showing the results of examinations of 254 stomachs of the Screech Owl (Megascops asio)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Keokuk, Iowa	Dec. 14, 1885			House mouse	
Alton, N. J	Nov. 26, 1890			1 white-footed mouse, 1 pine mouse.	Grasshopper remains.
Do	Dec. 1, 1890				Frog.
Hanover, N. J	Dec. 3, 1890			Meadow mouse	
Do	Dec. 4, 1890				Empty.
Alton, N. J	Jan. 14, 1891			Mouse hair	
Do	Feb. 16, 1891			do	
Do	Mar. 2, 1891			do	
Sandy Spring, Md	Dec. 15, 1891			do	
Lancaster County, Pa.	Nov. 27, 1891		English sparrow		5 cave crickets, beetle, 2 spiders.
Do	Dec. 7, 1891		2 English sparrows.		
Do	Dec. 14, 1891				Empty.
Do	Nov. 19, 1891			House mouse	
Do	Nov. 26, 1891				Do.
Do	Dec. 15, 1891				Insect remains.
Do	do				Do.
Four-Mile Run, Va	Feb. 14, 1892				Empty.
Portland, Conn	Jan. 14, 1887			Mouse hair	
Do	Apr. 1, 1892				Do.
Marshall Hall, Md	May 30, 1892				Beetle remains.
Do	do				Insect remains.
Do	do				8 beetles, 1 lizard.
Do	do				3 May beetles, 1 lizard.
Liberty County, Ga	Apr. 14, 1892			White-footed mouse.	
Easton, Md	Dec. 17, 1891			House mouse	Small beetle.
Sandy Spring, Md	Jan. 12, 1891		Junco	Mouse hair	
Do	Jan. 16, 1892		Sparrow	House mouse	
Washington, D. C	Jan. 24, 1892			do	
Galena, Mo	July, 1892			Wood rat	Beetles.
Virginia				Small piece of flesh.	Do.
Do				do	
Bakersfield, Cal	July 20, 1891				Grasshoppers, spider.
Visalia, Cal	July 24, 1891				Grasshoppers, beetles.
Falls Church, Va	Feb. 22, 1892		Junco	Meadow mouse	
Ithaca, N. Y	Mar. 14, 1892			Chipmunk	

SUMMARY.—Of 255 stomachs examined, 1 contained poultry; 38, other birds; 91, mice; 11, other mammals; 2, lizards; 4, batrachians; 1, fish; 100, insects; 5, spiders; 9, crawfish; 7, miscellaneous; 2, scorpions; 2, earthworms; and 43 were empty.

FLAMMULATED SCREECH OWL.

Megascops flammeolus.

[Plate 26—Megascops flammeolus idahoensis.]

This Owl inhabits the highlands of Central America and Mexico, ranging northward into the United States as far as California, Idaho,* Texas, and Colorado. It was first captured within our limits at Fort Crook, Cal., in August, 1860, and at the present time is one of the rarest Owls in the United States. More specimens have been taken in Colorado than in all the other States, and so far this is the only region where it has been found breeding.

* Since the above was written Dr. Merriam has described the specimen which he secured at Ketchum, Idaho, as a new race under the name of *Megascops flammeolus idahoensis*. (N. A. Fauna No. 5, 1891, p. 96.)

From the little that is known of its habits it is presumed that they do not differ in any marked degree from those of the Common Screech Owl. Its food also is probably the same, although the only data we have on this subject is the result of examinations made by Dr. C. Hart Merriam, of the stomach contents of two specimens killed by him in the Grand Cañon of the Colorado September 13, 1889, and at Ketchum, Idaho, September 22, 1890. The stomach of the former contained one scorpion, some beetles, and a few other insects, and that of the latter, grasshoppers, ants, and other insects.

DESCRIPTION.

Toes entirely naked to extreme base. Ear tufts small; above, finely mottled grayish, with small, irregular black stripes, and blotches of orange rufous; below, whitish, with streaks and transverse bars of blackish. Wings, 5.10 to 5.60 inches (130 to 142^{mm}); tail, 2.60 to 3 inches (65 to 75^{mm}).

GREAT HORNED OWL.

Bubo virginianus.

[Plate 24—Adult.]

The Great Horned Owl is found in suitable localities throughout the greater part of North America, Costa Rica, so far as known, being the southern limit of its range. Like other birds and mammals which have a wide and diversified range, this species is modified by climate and other local influences so that it is separable into several well-marked geographical races. The typical form (*Bubo virginianus*) ranges from Labrador and the eastern United States south through eastern Mexico to Costa Rica.

The Dusky Horned Owl (*Bubo v. saturatus*) inhabits the northwest coast region from Oregon to Alaska, and also Labrador; recently it has been found to extend south through the Rocky Mountains to Colorado and Arizona (N. A. Fauna, No. 3, 1890, p. 91).

The Western Horned Owl (*Bubo v. subarcticus*) inhabits the western United States (except the northwest coast), ranging eastward across the Great Plains (straggling to northern Illinois, Wisconsin, and western Ontario), northward to Manitoba, and southward over the table-lands of Mexico.

The Arctic Horned Owl (*Bubo v. arcticus*) inhabits Arctic America, chiefly in the interior, ranging south in winter to Manitoba and the mountains of Dakota and Montana.

In studying this Owl in relation to its food habits it will be perceived at a glance that a bird so powerful and voracious may at times be a source of great benefit, while at other times it may be the cause of great damage. Now, the serious inroads it makes on the tenants of the poul-

try yard, as well as the destruction of many game and song birds would seem to call for the total suppression of the species. Again, when engaged chiefly in the capture of injurious rodents, which threaten the very existence of the crops, it is the farmer's most valuable ally and consequently should be most carefully protected.

The food of this species is of great variety ; birds and mammals as well as reptiles, fish, crustaceans, and insects contribute to its fare. Among the birds most often taken may be mentioned all kinds of poultry (including half-grown turkeys), grouse, quail, doves, and wild ducks. Even hawks, crows, and other owls do not escape the voracity of this tiger among birds, and the large hawks are among those attacked and eaten.

Of all the birds of prey, with the exception possibly of the Goshawk and Cooper's Hawk, the Great Horned Owl is the most destructive to poultry. All kinds of poultry seem to be taken, though when Guinea fowls and turkeys are obtainable it shows a preference for these. In sections of the country where it is common the inhabitants often complain bitterly of its ravages. An examination of the table at the end of this article will show that a large proportion of the specimens contained the remains of poultry.

The following from Dr. B. H. Warren's report on the birds of Pennsylvania (p. 118) shows a still larger proportion of this class of food: "My own records of sixteen examinations of Great Horned Owls, which, with one exception, were taken during the winter months, revealed in eleven individuals only remains of poultry; two others, portions of rabbits, and of the three remaining birds of this series it was found that one had taken two mice; another showed small amount of hair, apparently that of an opossum. The sixteenth and last bird contained a mouse and parts of beetles."

The following, from the pen of Dr. P. R. Hoy, shows how destructive a single Owl may be: "The specimen in the collection of the academy was known to carry off from one farm, in the space of a month, not less than twenty-seven individuals of various kinds of poultry before it was shot." (Proc. Phila. Acad. Nat. Sci., vol. VI, 1853, p. 307.)

Dr. C. Hart Merriam gives the following account of its depredations: "Indeed I have known one to kill and decapitate three turkeys and several hens in a single night, leaving the bodies uninjured and fit for the table." (Birds of Connecticut, 1877, p. 97.) This preference for the heads of their victims is more or less common to all birds of prey, as is shown by the universal habit of eating this part first.

In portions of the country where game birds are common the depredations among them are nearly, if not fully, as great as in the poultry yard. Ruffed Grouse particularly seem to suffer, probably on account of their conspicuous size. Mr. E. E. Seton found two Ruffed Grouse and a hare in the nest of this species in Manitoba. (Auk, vol. II, 1885, p. 21.) A number of stomachs recorded in our table contained the re-

mains of this noble game bird. Domesticated pigeons sometimes seem to be particularly agreeable to the Owl's taste and the neighboring dove cotes suffer correspondingly.

The rabbit undoubtedly stands at the head of the list of the mammals most often fed upon by this Owl. In fact its great love for the flesh of rabbits is one of this Owl's redeeming qualities. In some parts of the West, where rabbits are so numerous that it is next to impossible to bring to maturity any large proportion of the crops, this Owl feeds on this destructive rodent almost to the exclusion of other food. The examination of a number of stomachs revealed the fact that even in the East, where rabbits are not so abundant, their remains constitute a fairly large proportion of the contents. The writer is of the belief that where rabbits are comparatively abundant the species under consideration rarely molests poultry, and is a prime factor in destroying these destructive rodents.

Dr. W. S. Strode, in an article on 'The Food of the Owls' in the American Naturalist for January, 1889, states that the principal food of this Owl in the Spoon River country, Illinois, is small rodents, chiefly the gray rabbit. In seven nests examined the remains of at least a dozen rabbits were found.

Gophers, or more correctly speaking, spermophiles or ground squirrels, which furnish food for so many kinds of rapacious birds and mammals in the West, must afford a never-failing supply of food for this Owl in some regions. There is little direct testimony on the subject, but the great fondness this bird has for the arboreal squirrels in the East justifies this conclusion.

The Great Horned Owl has been often credited with being an expert ratter. The following extract from a letter from O. E. Niles to Charles Dury, of Cincinnati, furnishes very interesting and detailed information on the subject: "For many years I have personally known the value of our large Horned Owl as a 'ratter,' and will cite one instance in particular as proof. About eight years ago one of my men discovered a pair of owlets of the large-horned variety in an old sycamore stub near my stables on my farm, and concluded to capture them alive. With some risk to himself he succeeded in securing them, but not without a regular fight with the old ones, who gave him a few wounds. In the nest where he captured the young owls he noticed several full-grown Norway rats, with their skulls opened and the brain removed. On descending to the ground he also noticed the bodies of many rats around the tree, and out of curiosity counted them, and found the bodies of one hundred and thirteen rats, most of them full grown. They all appeared to simply have had their skulls opened and the brains removed; and, from their undecayed appearance, must all have been captured within the previous week or ten days." (Journal Cincinnati Soc. Nat. Hist., vol. VIII, April, 1885, p. 66.)

Among the mammals whose remains are less often found among the

stomach contents may be mentioned muskrats, woodchucks, and opossums. It also feeds on mice and shrews, but to a much more limited extent than do the smaller Owls. In certain parts of its range, where the skunk is common, especially in the springtime, this animal forms a not uncommon article of food. Probably all collectors and taxidermists will bear out this assertion. Fully one-half of the owls skinned, if they do not at the time have the remains of this mammal in the stomach, give evidence of having been in contact with it by the strong scent on the plumage.

The late Dr. J. M. Wheaton, in his report on the birds of Ohio, 1882, sums up its food as follows: "The food of the Great Horned Owl consists of small quadrupeds, such as rats, mice, squirrels, and occasionally rabbits, birds, reptiles, and fish." (p. 407.)

An instance of its feeding on a porcupine is recorded by Charles R. Coombs (Ornith. and Oologist, vol. XIV, February, 1889, p. 29). The bird, which was killed at Castine, Me., was found to have the flesh and the roof of the mouth literally packed with the quills of this rodent. It is probable that the bird eventually would have succumbed to the effects of the quills, as do all mammals and birds, not excepting the panther, which are so voracious or shortsighted as to attack this sluggish animal. Nuttall mentions a case where a Great Horned Owl attacked a cat, which is of such interest that we embody it here: "My friend, Dr. Boykin, of Milledgeville, in Georgia, assured me that one of our own daring nocturnal adventurers, prowling round his premises, saw a cat dozing on the roof of a smokehouse, and supposing grimalkin a more harmless, rabbit-like animal than appeared in the sequel, blindly snatched her up in his talons; but finding he had caught a tartar, it was not long before he allowed puss once more to tread the ground." (Land Birds, 1832, p. 126.)

There are several species of Owls which show great fondness for fish when circumstances throw them in their way. A. M. Frazar found the ground under the nest of a Great Horned Owl literally strewn with fish scales. (Bull. Nutt. Ornith. Club, vol. II, 1877, p. 80.) William Brewster found in the stomach of an Owl killed at Tucson, Ariz., beetles, portions of crawfish, and a few fish scales. (Bull. Nuttall Ornith. Club, vol. VIII, 1883, p. 27.) Crawfish are eaten occasionally, but not so often as by the Barred Owl.

In our examination of stomachs we have never found the remains of batrachians, though doubtless they are sometimes used as food. Among insects the larger night-flying beetles are the ones most often taken.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.

Lepus americanus.
Lepus sylvaticus.
Lepus sylvaticus arizonæ.
Sigmodon hispidus arizonæ.
Thomomys talpoides umbrinus.
Thomomys clusius fuscus.

MAMMALS—continued.

Neotoma mexicana.
Neotoma cinerea.
Tamias dorsalis.
Onychomys torridus.
Onychomys leucogaster.
Sitomys eremicus.
Spermophilus grammurus.
Spermophilus harrisi.
Fiber zibethicus.
Fiber zibethicus arizonæ.
Sciurus niger ludovicianus.
Arvicola riparius.
Arvicola austerus.
Arvicola longicaudus.
Arvicola pauperrimus.
Arvicola mordax.
Blarina brevicauda.
Mus musculus.
Mus decumanus.
Vespertilio noctivagans.
Evotomys gapperi.
Sorex.
Sciuropterus volucella.
Perodipus ordii.

BIRDS.

Rallus crepitans.
Colinus virginianus.
Bonasa umbellus.
Tympanuchus americanus.
Accipiter cooperi.
Chondestes grammacus.
Junco hyemalis.
Mimus polyglottos.
Merula migratoria.

The Horned Owl breeds throughout its entire range, and is one of the earliest of the rapacious birds to commence family duties. In the southern part of its range the eggs are deposited in December and January, and in northern Alaska, Mr. Robert Kennicott found eggs in the early part of April. So cold was the weather at the time that the eggs were frozen while being carried to the fort. In the Northern and Eastern States it breeds in correspondingly cold weather, and in southern New York, in the month of February, the writer once observed icicles hanging from a nest which contained two eggs. Snow had fallen the previous day and probably had covered the setting bird as well as the rim of the nest. The warmth from the bird's body melted the snow, and the water which passed through the bottom of the nest soon congealed again in the frosty air and formed the icicles.

That this Owl does occasionally build its own nest is undoubtedly true, but in these sections, where old nests of hawks and crows are common, it usually remodels one of them and adds a sparse lining of evergreen leaves and feathers from its body as a finishing touch. The situation of the nest is varied. It may be placed among the branches of a tree or in a hollow trunk or limb. In the South the habit of nesting in hollow trees is much more common than northward, and, according to Mr. Maynard, it is a nearly universal habit with the bird in Florida. In the former case the nest is more or less bulky; when built in a hollow tree it is little more than a lining to the cavity. The nest is more often found in evergreen than in deciduous trees, and is usually placed in a crotch near the top. In localities where suitable trees are scarce the bird has been known to place its nest in even a crevice of a rocky cliff. The number of eggs in a set is usually two, though three or four are

sometimes found. The period of incubation is, probably, about four weeks.

The young grow slowly and remain in the nest from ten to twelve weeks. Until four or five months old they retain considerable down, and it is probably not until August that they molt their first feathers and gain the full plumage.

After the breeding season the Great Horned Owl, like many others, will wander more or less in search of food, but at no time is there a migration which is at all comparable to that of the Snowy or Hawk Owls. Though a bird of retiring habits, this is one of the best-known species, from its large size, striking appearance, beautiful plumage, and particularly from the frequent forages it makes on the poultry yard. Although averaging a little less in measurement than the Snowy or Great Gray Owls, it is probably heavier than either.

It inhabits large wooded tracts, and where this character of country exists it is a common species. Like many other birds and animals it becomes scarce or disappears altogether from localities where the demands of agriculture cause the melting away of the forests and woodlands. In its forest home it finds not only more or less seclusion from the bright rays of the sun and from the worry of its numerous tormentors, but also the various mammals and birds upon which it chiefly subsists. Thus its abode is not only a citadel but also a well-stocked larder. Although it remains quiet on bright days, its vision is powerful in the strongest light. Any one who has ever attempted to stalk one of these Owls is well aware what a difficult task it is and how much better is the Owl's eyesight than his own. In dark, cloudy weather this species flies more or less at all times of the day, and in the breeding season it probably hunts day or night indifferently.

Dr. Coues, in the 'Birds of the Northwest,' relates that a couple of pet Owls watched without inconvenience two white cranes which were circling half a mile high in the direct line of the sun. Looking up to see what had attracted the bird's attention the doctor was nearly blinded by the intense light of the sun's rays.

In disposition the Horned Owl is fierce and untamable, and in point of strength and courage is inferior to none of our rapacious birds. It is so savage and seemingly so devoid of the confidence usually shown by the birds of prey kept in confinement that it is with the greatest difficulty that it can be tamed even when taken young from the nest. It is morose and sullen, lacks affection for its keepers, and often will fly viciously at anyone who attempts to handle it or enter the apartment in which it is confined. A notable exception to this untamable character are the two Owls above mentioned, belonging to Dr. Coues. They were kind and gentle and showed no impatience when handled, and were allowed their liberty at night, which they spent in foraging, but always returned in the morning.

DESCRIPTION.

Large and heavy. Ear tufts very conspicuous. Plumage irregularly varied with buffy, tawny, whitish, and dusky, one or other of these colors predominating in the different races. The buffy and tawny tints are most marked in the typical bird, the dusky in the dusky Horned Owl, and the white in the Arctic bird.

Length: 18 to 25 inches (456 to 635^{mm}); extent, 49 to 57 inches (1245 to 1448^{mm}); wing, 14.50 to 16 inches (368 to 406^{mm}); tail, 8.25 to 9 inches (210 to 229^{mm}).

Table showing the results of examinations of 127 stomachs of the Great Horned Owl (Bubo virginianus).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chattanooga, Tenn.	Dec. 25, 1885	Quail			
New London, Wis	Oct. 25, 1886			Fox squirrel	
Chester County, Pa	May 11, 1886	Guinea fowl.			
Adairsville, Ga	May 20, 1886				Beetle.
Lockport, N. Y	Jan. 2, 1887	Fowl			
Do		do			
East Hartford, Conn	June 16, 1887	do		Rabbit	
Sing Sing, N. Y	Jan. 19, 1883	Guinea fowl.			
Do	July 9, 1884	Fowl	Robin		
Do	Nov. 12, 1884			Shrew	
Do	Feb. 26, 1885			Rabbit	
Paint Rock, Tex	Apr. 23, 1887		Cooper's hawk, lark finch, mocking bird.		
Sandy Spring, Md	Mar. 12, 1887	Pigeon		Meadow mouse.	
Chester County, Pa	Feb. 15, 1886			Rabbit	
Do	Sept. —, 1878	Poultry			
Dakota County, Nebr.	July —, 1869			Gopher	30 insects.
Elmira, N. Y	Oct. 4, 1885			Skunk	
Do	Oct. 7, 1886	Ruffed grouse.			
Corning N. Y	Aug. 15, 1884			Gray squirrel	
Tyrone, N. Y	Sept. 4, 1886	Poultry			
Elmira, N. Y	Nov. 5, 1885	do			
Breeseport, N. Y	Nov. 2, 1886			Rabbit	
Canton, Pa	Dec. 13, 1884			Skunk	
Tioga, Pa	Dec. 15, 1884			Weasel (?)	
Gaines, Pa	Dec. 29, 1885	Ruffed grouse.			
Elmira, N. Y	Jan. 3, 1881	Poultry			
Do	Jan. 5, 1885				Empty.
Big Flats, N. Y	Jan. 17, 1886	Poultry			
Erin, N. Y	Jan. 29, 1887	Ruffed grouse.			
Sandy Spring, Md	Apr. 7, 1888			Rabbit	
Raleigh, N. C	Mar. 9, 1888			do	
East Hartford, Conn	Nov. 23, 1887				Do.
Buffalo Gap, S. Dak	June 26, 1888			Rabbit, meadow mouse, grasshopper mouse.	4 beetles.
Sandy Spring, Md	Sept. 3, 1888			Rat, house mouse, meadow mouse.	Dung beetle.
Bridger Pass, Wyo	Sept. 9, 1888			Wood rat, meadow mouse, white-footed mouse.	Cuterebra.
Virginia	Oct. 23, 1888			Rabbit, silver-haired bat.	Spider, katydid.
Buckhannon, W. Va	Aug. 16, 1888			Rabbit	Maybeetle.
Fairmont, W. Va	Sept. 22, 1888				Snake.
Virginia	Nov. 22, 1888				Empty.
Suffolk county, N. Y	April 3, 1889			Rabbit	
Winnipeg, Manitoba	Feb. —, 1889			Hare	
Do	do			Red-backed mouse, shrew.	
Do	do			Hare	

Table showing the results of examinations of 127 stomachs of the Great Horned Owl (Bubo virginianus)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Winnipeg, Manitoba	Feb. —, 1889			Hare	
West Virginia	May 3, 1889			Rabbit	
Winnipeg, Manitoba	Mar. —, 1889			Hare	
Do	....do				Empty.
Do	....do			Hare	
Do	....do			6 white-footed mice, 1 red-backed mouse, 4 shrews.	
Do	....do			Hare	
Gold Hill, Colo	Summ'r, 1889			Rabbit (?)	
Owego, Tioga County, N. Y.	June 17, 1889				Offal.
Tuba City, Ariz	Sept. 23, 1889		Small bird		
Sandy Spring, Md	Oct. 12, 1889		Feathers		
Do	Nov. 20, 1889	Fowl			
Rensselaer County, N. Y.	Nov. 25, 1879	....do			
Do	Nov. 2, 1880	....do			
Washington County, N. Y.	Nov. 12, 1884			Hair	
Albany County, N. Y.	Nov. 2, 1886			....do	
Rensselaer County, N. Y.	Nov. 4, 1886			Muskrat	
Troy, N. Y	Nov. 12, 1886			Hair	
Brookville, Ind	Jan. 14, 1887				Empty.
Adams, Ind	Jan. 18, 1887				Do.
Union County, Ind	Jan. 8, 1888	Fowl			
Kalamazoo, Mich	——— , 1886			Rabbit	
Luck, Wis	Oct. 15, 1886	Fowl			
Concord, Mass	Apr. 22, 1877			Rabbit	
Chester County, Pa	May 20, 1882	Fowl			
St. Helena Island, S. C.	Feb. 26, 1886		Clapper rail	Marsh rabbit	
Cincinnati, Ohio	May 13, 1884	Feathers		Hair	May beetle.
Do	Nov. 20, 1884	Quail			
Do	Nov. 24, 1884	Fowl			
Ercildoun, Pa	Mar. 18, 1889		3 juncos	Rabbit	
Toronto, Ontario	Jan. 29, 1890			Short-tailed shrew.	
Greensboro, Ala	Jan. 23, 1890	Poultry			
San Francisco Mountain, Ariz.	Aug. 24, 1889				Grasshopper.
Rockland County, N. Y.	Mar. 14, 1880	Poultry			
Orange County, N. Y.	Oct. 17, 1876				Empty.
Circleville, Ohio	Dec. 10, 1881			Rabbit	
Camp Verde, Ariz	Sept. 7, 1884				Do.
Do	Dec. 30, 1884			Cotton rat, wood rat, and pocketgopher.	
Do	Jan. 1, 1885			Wood rats, cotton rats.	
Do	Jan. 3, 1885			Small mammals	
Do	Jan. 4, 1885				Do.
Do	....do				Do.
Do	Feb. 9, 1885			Desert rabbit	
Do	Mar. 2, 1885			2 kangaroo rats	
Do	Sept. 3, 1885			Mice, pocket gopher, Gila chipmunk.	
Do	Sept. 17, 1885				Do.
Do	Oct. 28, 1885			2 Harris's chipmunks, grasshopper mouse.	
Do	Oct. 30, 1885			Woodrat, other remains.	
Do	Dec. 26, 1885			Desert mice, cotton rats.	
Do	Jan. 15, 1886			6 kangaroo rats	
Do	May 14, 1886			Hair	
Do	Aug. 23, 1886				Do.
Do	Aug. 28, 1886			Rock squirrel, other rodents.	
Do	Aug. 30, 1886				Do.
Do	Dec. 26, 1886			Desert rabbit	
Do	Mar. 14, 1887			Muskrat	

*Dr. E. A. Mearns states that nearly all the specimens from Arizona which he examined had a strong skunky odor.

Table showing the results of examinations of 127 stomachs of the Great Horned Owl (Bubo virginianus)—Continued.

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Yavapai County, Ariz.	May 20, 1887				Indeterminate matter.
Camp Verde, Ariz.	Dec. 12, 1887			Cotton rats	
Do	Dec. 13, 1887			Small rodents	
Do	Feb. 15, 1888				Empty.
Do	Mar. 26, 1888				Do.
Do	Apr. 11, 1888			Muskrat, wood rat.	
Morristown, N. J.	Apr. 28, 1890			Flying squirrel, rabbit.	
Clay County, S. Dak.	Sept. 18, 1889	Fowl			
Do	Oct. 27, 1889			Rabbit	
Vermillion, Clay County, S. Dak.	Nov. 18, 1889	Wild duck.			
Do	Dec. 17, 1889				Do.
Do	Dec. 28, 1889			Muskrat	
Do	Feb. 17, 1890		Snowbird		
Do	Feb. 26, 1890	Prairie hen.		Meadow mouse	
Saw Tooth Lake, Idaho.	Sept. 30, 1890			2 pocket gophers, 1 white-footed mouse, 2 meadow mice.	
Keokuk, Iowa	Oct. 28, 1888		3 small birds		
Durand, Wis	May 31, 1885			Squirrel	
Do	...do				Fish.
Union County, Ky.	Apr. 3, 1890			Rabbit	
Do	Apr. 26, 1890			...do	
Sabula, Iowa	Nov. 22, 1891			...do	
Lancaster County, Pa.	Nov. 10, 1891			...do	
Do	Dec. 15, 1881			...do	
Marshall Hall, Md.	May 30, 1892				Dung beetle.
Sandy Spring, Md.	Mar. 16, 1892				12 dung beetles.
Walker Basin, Cal.	July 14, 1891			Wood rat	Scorpion.
Worcester, Mass	Mar. 26, 1892				Empty.
Montgomery County, Md.	Sept. —, 1892	Fowl			Beetle.

SUMMARY.—Of 127 stomachs examined, 31 contained poultry or gamebirds; 8, other birds; 13, mice; 65, other mammals; 1, a scorpion; 1, fish; 10, insects, and 17 were empty.

SNOWY OWL.

Nyctea nyctea.

This large and handsome Owl is circumpolar in its distribution, inhabiting the arctic portions of the northern hemisphere in summer and migrating south in winter. In North America it is rare west of the Rocky Mountains and south of our northern border, but in the East it is sometimes common as far south as the fortieth parallel, and as an accidental visitor nearly reaches the southern border of the United States. In Europe and Asia it extends south either regularly or accidentally to the British Isles, Holland, Belgium, Germany, southern Siberia, Turkestan, and Afghanistan.

It must not be understood that all or even any considerable portion of these Owls migrate very far south of their arctic home, for the birds which reach the United States or Southern Canada are but a small fraction of those which pass the winter near the northern line of trees. Although from some unknown cause, presumably the lack of food, there

are sometimes quite extensive migrations along the eastern seaboard. For instance, in the winter of 1876–'77, in New England alone, Mr. Ruthven Deane knew of some 500 being seen, the majority of which were shot. (Bull. Nuttall Ornith. Club, vol. II, 1877, p. 10.)

It appears in the United States sometimes as early as October and a few occasionally remain until May. At Point de Monts on the north shore of the St. Lawrence River it has been taken as late as May 31, though the specimen was probably a pensioner. During migration flights of these Owls are observed sometimes far out to sea.

In the far north, lemmings and arvicoline mice furnish almost the exclusive food of this Owl in summer, but during the winter wanderings, when these mammals are not always obtainable, it takes what food it can get, such as fish, hares, muskrats, squirrels, rats, ptarmigans, ducks, or even offal.

From the following quotations it will be seen how universally this Owl depends on the lemmings for food:

Lieut. (now Gen.) A. W. Greely says: "Our observations agree with that officer [Maj. Feilden] to the effect that the food of this bird seems to consist entirely of the lemming." (Three Years of Arctic Service, vol. II, 1886, p. 381.)

Mr. Henry Seebohm says: "The lemming forms the Snowy Owl's chief food in the Far North, the range of both mammal and bird being generally the same; but other small rodents are taken, and it will sometimes attack Ptarmigan and Willow Grouse, or even the arctic hare. It is said occasionally to feed on fish." (Hist. British Birds, vol. I, 1883, p. 181.)

Mr. John Murdoch says: "Its abundance in the spring and summer near the coast appears to depend on the presence or absence of its favorite food, the lemming, as has been noted elsewhere by Mr. Nelson. During the season of 1882 we saw no lemmings, though signs of their presence in the shape of droppings, and their skulls and skeletons in the owls' castings, were numerous all over the tundra. During that season we saw but few owls. On the other hand, in 1883, lemmings were exceedingly plenty all around the station and owls were proportionately abundant; scarcely a day passed without one or more being seen sitting on the tundra, generally on the top of a bank or small knoll, on the lookout for lemmings." (Expedition to Point Barrow, Alaska, 1885, p. 107.)

Of the ten or twelve specimens which Dr. Leonhard Stejneger secured on Bering Island all except one contained the remains of arvicoline mice. The largest number found in the stomach of one individual was six, but in another the stomach was spoken of as 'crammed with arvicolæ,' so that probably it contained at least ten or fifteen mice. The extent of the dependence of this Owl upon mice is shown by a very interesting fact relative to the recent increase of the Owl on Bering Island, which the latter author records. Prior to 1870 there were no

mice, and very few Owls ever visited the island. About this date the house mouse (*Mus musculus*) was introduced from ships and the Red-backed Mouse (*Evotomys rutilus*) in some unknown way. Twelve years afterwards he found the island swarming with mice and an abundance of resident Owls, affording a striking demonstration of the perfect workings of nature, for with the undue increase of any one species there occurs a corresponding increase of its natural enemies.

Dr. Stejneger says: "From * * * the contents of the stomachs, it would seem as if *Arvicola* was almost their only food. But it is only fair to state that I have seen this owl chase sea ducks, especially *Histrionicus histrionicus* out at the reef, very much in the same manner as does the falcon." (Bull. U. S. Nat. Mus., No. 29, 1885, p. 223.)

Mr. Thomas McIlraith, in 'The Birds of Ontario,' mentions one which made several attempts to capture a wounded duck, in which effort it probably would have succeeded had it not itself been killed. On the Mackenzie River, Richardson relates that one of the Owls was seen to fly over a cliff and carry off a full-fledged Duck Hawk in its claws, with which it alighted on the opposite bank of the river. The parent Hawk followed, uttering loud screams, and darting down struck the Owl, killing it instantly. Wilson and Audubon, who knew the bird only during its short winter visits, speak of its food as follows:

Wilson says: "The usual food of this species is said to be hares, grouse, rabbits, ducks, mice, and even carrion. * * * I met with this bird on Oswego River, New York State, a little below the Falls, vigilantly watching for fish." While according to Audubon, "Its usual food, while it remains with us, consists of hares, squirrels, rats, and fishes, portions of all of which I have found in its stomach. * * * In one of them I found the whole of a large brown rat, in pieces of considerable size, the head and tail almost entire."

Although most of the Owls will occasionally eat fish, this species seems to be especially fond of them, and when kept in confinement will eat them in preference to anything else except mice. Audubon describes the manner in which it catches fish, being an eye witness to the occurrence several times, and the following is what he says: "At the break of day one morning, when I lay hidden in a pile of floated logs at the Falls of the Ohio, waiting for a shot at some wild geese, I had an opportunity of seeing this owl secure fish in the following manner: While watching for their prey on the borders of the pots, they invariably lay flat on the rock, with the body placed lengthwise along the border of the hole, the head also laid down, but turned towards the water. One might have supposed the bird sound asleep, as it would remain in the same position until a good opportunity of securing a fish occurred, which I believe was never missed; for as the latter unwittingly rose to the surface near the edge, that instant the owl thrust out the foot next the water, and, with the quickness of lightning, seized it and drew it out. The owl then removed to the distance of a few

yards, devoured its prey, and returned to the same hole; or, if it had not perceived any more fish, flew only a few yards over the many pots there, marked a likely one, and alighted at a distance from it. It then squatted, moved slowly towards the edge, and lay as before, watching for an opportunity. Whenever a fish of any size was hooked, as I may say, the owl struck the other foot also into it, and flew off with it to a considerable distance." (Ornith. Biography, vol. II, p. 136.)

The three specimens examined by Dr. B. H. Warren contained respectively the remains of a rabbit, of a rat, and offal.

The economic value of the Snowy Owl is limited, owing to the fact that it chiefly inhabits inhospitable regions where agriculture is impossible. Nevertheless, large numbers occasionally visit Canada and the United States, and it can not be doubted that during these visits its service to the agriculturist is beneficial. Mice and lemmings appear to be its chief dependence, and it takes them to the exclusion of all other food whenever it can get them. The number of useful birds it destroys is quite disproportionate to the number of injurious rodents to be credited to its account, and it is to be regretted that the snowy plumage of the bird and its showy appearance render it an object of pursuit for ornamental purposes.

The following species of mammals and birds were positively identified among the stomach contents:

MAMMALS.	BIRDS.
Arvicola riparius.	*Colymbus auritus.*
Mus decumanus.	*Colymbus holbœllii.*
Sitomy samericanus.	*Simorhynchus pusillus.*
Lepus sylvaticus.	*Larus philadelphia.*
	Merganser.
	Tympanuchus americanus.

The breeding range of this Owl extends from the limit of trees north to a point beyond that reached by any explorer. Maj. Fielden saw it in Grinnell Land at latitude 82° 40′, and Lieut. (now Gen.) A. W. Greely states that it bred abundantly in the vicinity of Fort Conger, latitude 81° 44′. It is resident through the northern part of Alaska, both on the islands and mainland. McFarlane did not find its nest at Fort Anderson, but it probably breeds in suitable localities in the interior south of that place, for it is reported as breeding in northern Labrador and Newfoundland. In exceptional cases, where it has been found breeding as far south as the latter places, the elevation of the locality compensates for the low latitude.

The eggs are deposited from the middle of May to the latter part of June, according to whether the locality is in the southern or northern part of the range, though Gen. Greely found eggs by May 25, and young as early as July 8. The number of eggs in a set varies from five to ten, and are deposited at intervals, so that when the last bird breaks the shell the oldest one is often nearly ready to fly.

The situation of the nest, if the few feathers, lichens, or moss composing it may be called a nest, is on some knoll slightly elevated above the surrounding country and usually occupies a slight depression in the ground. During the time the female is setting the male keeps guard and drives off any intruder, at times attacking even human beings. It the duty of the male to procure the food for the young, and the female apportions it among the family.

The bird is naturally very gentle in disposition and soon becomes tame in confinement. It has been taught to remain in the vicinity of its home and return to its master at the sound of a whistle. In the open country it is shy and very difficult to approach, though it is said to be less so in the wooded districts. The natives frequently decoy the bird near enough to shoot by attaching a bit of fur to the end of a string and allowing it to trail behind them as they walk; the Owl, thinking it a mouse, flies down to seize it, when the hunter turns around and shoots the bird.

The Snowy Owl is diurnal in its habits, but like most birds is more active in search of prey during the early morning and again toward dusk. Like many of the Hawks, it occupies a commanding perch for hours, watching what is going on about it, occasionally varying the monotony by dropping on a mouse or launching out over the broad country, soon to return to its perch. During its southern wanderings it is very partial to localities in the vicinity of water, especially the barren sand wastes along the seashore or extensive marshy flats bordering the bays and rivers.

Dr. William Wood states that he once knew one of these Owls to hide in a hollow apple-tree stub to escape the annoyance caused by a mob of crows following him, which ruse accomplished the desired result.

The flesh is light colored, somewhat resembling that of the chicken in appearance, and is very much relished by the Eskimo hunters. Thus this bird, unlike its congeners, has some value to humanity as a food.

The flight is firm, smooth, and noiseless, and may be long protracted. It is capable of rapid flight, and, according to Audubon, is able to capture ducks, pigeons, and even grouse on the wing, striking them down after the manner of the duck hawk.

DESCRIPTION.

Ear tufts rudimentary. Plumage pure white, sometimes almost unspotted, but usually marked more or less with transverse spots or bars of slaty brown.

Length: 20 to 27 inches (508 to 685^{mm}); extent, 59 to 62.50 inches (1500 to 1588^{mm}); wing, 15.50 to 18.75 inches (393 to 476^{mm}); tail, 9 to 10.30 inches (229 to 262^{mm}).

Table showing the results of examinations of 38 stomachs of the Snowy Owl. (Nyctea nyctea.)

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Washington, D. C.	Nov. 11, 1885				Empty.
Portland, Conn.	Nov. 20, 1885				Do.
Keokuk, Iowa	Dec. 6, 1886	Prarie hen.		Meadow mouse.	
Lockport, N. Y.	Nov. 17, 1886				Do.
Do	do				Do.
Chester County, Pa.	Dec. 14, 1886			House rat.	
Dakota	Feb. —, 1889			3 white footed mice.	
Winnipeg, Manitoba	Mar. —, 1889	Wild duck.		Meadow mouse	
Do	do		2 feathers		
Do	do		Feathers		
Do	do			2 meadow mice, white-footed mouse.	
Do	do		Small finch	Meadow mouse, white-footed mouse	
Do	do			14 white-footed mice, 3 meadow mice.	
Sac County, Iowa	Dec. 28, 1882			Mouse	
Story County, Iowa	Feb. 7, 1882			Rabbit	
Matinicus Isle, Me.	Dec. 15, 1886		Large bird		
Do	do				Do.
Washington County, N. Y.	Feb. 25, 1887				Do.
Toronto Island, Ontario.	Dec. 28, 1889		Bonaparte's gull	Rat	
Do	Dec. 15, 1889			do	
Do	Dec. —, 1889			do	
Do	Dec. —, 1889			do	
Do	Jan. 3, 1890			White-footed mouse, 2 meadow mice.	
Montauk Point, N. Y.	Nov. 25, 1889			Meadow mouse	
Huntington, N. Y.	Dec. 17, 1889		Horned grebe		
Montauk Point, N. Y.	Dec. 12, 1889				Do.
Long Island, N. Y.	Dec. 1, 1875		Feathers		
Garden City, Long Island, N. Y.	Oct. 29, 1880				Do.
Vermillion, Clay County, S. Dak.	Nov. 18, 1889			White-footed mouse.	
Do	Feb. 26, 1890				Do.
Dover, N. J	Dec. 2, 1890				Do.
Do	Dec. 12, 1890			Rabbit	
Montauk Point, N. Y.	Dec. 5, 1890		Red-necked grebe.	5 meadow mice.	
Do	do				Do.
Do	do			8 meadow mice.	
Buffalo, N. Y	Feb. 28, 1891			Meadow mouse.	
St. Paul Island, Bering Sea.	June 13, 1890		Least auklet		
Portland, Conn.	Dec. 12, 1890				Do.

SUMMARY.—Of 38 stomachs examined, 2 contained game birds; 9, other birds; 18, mice; 2, other mammals, and 12 were empty.

HAWK OWL.

Surnia ulula caparoch.

The typical form of the Hawk Owl inhabits the northern portions of the eastern hemisphere from Scandinavia to Kamtschatka, and occurs accidentally in western Alaska. Some authors consider the northern Siberian bird to be separable under the name of *Surnia u. doliata.*

The American bird (*Surnia u. caparoch*), which is merely a geographical race of the Old World species, inhabits the northern part of North America from Alaska and the central forest regions to Newfoundland,

straggling south in winter to the northern United States, and rarely to the British Isles. Some winters it is quite common in Nova Scotia and in the vicinity of Quebec and Montreal, in Manitoba and northern Maine; south of these points it is merely accidental.

The food of this Owl varies considerably at different times of the year. In summer it feeds on the smaller mammals, such as mice, lemmings, and ground squirrels as well as insects of various kinds, while in winter, when the snow is deep and its favorite food is hidden, it follows the large flocks of ptarmigans and subsists on them. Dr. Dall seldom found anything but mice in the crops of those he dissected in Alaska, and the following from Dr. Coues mentions the same food: "It feeds chiefly upon the field mice (*Arvicolæ*) which swarm in the sphagnous vegetation of arctic lands; also upon small birds, grasshoppers, and other insects." (Birds of the Northwest, 1874, p. 312).

Dr. C. Hart Merriam, in speaking of its winter food, says: "In the vicinity of Hudson Bay during the winter season, the White Ptarmigan (*Lagopus albus*) constitutes its chief article of diet; and it is said to follow the hunter, pouncing upon his game before he has time to reach it." (Review of Birds of Conn., 1877, p. 73.)

Mr. Henry Seebohm speaks of its food as follows: "The principal food of the Hawk Owl is mice and lemmings; and the bird follows the migratory parties of the last-named little mammal to prey upon them. From its indomitable spirit, however, few birds of the forest are safe from its attack. In addition to the smaller birds which it captures, Wheelwright mentions the fact that he has seen the Hawk Owl strike down the Siberian Jay, and has also disturbed it feeding on an old Willow Grouse. The same naturalist has also taken insects from its stomach." (Hist. British Birds, vol. I, 1883, p. 184.)

It is said to breed in northern Maine; but if this be true, it must be a very exceptional or accidental occurrence. The true home of the species is from Newfoundland, Labrador, and northern Manitoba, northward through the evergreen forests to their limit in the Arctic Circle, the bird being more abundant toward the far north.

This Owl begins to deposit eggs, even in the far North, as early as the 1st of April; Mr. McFarlane found a nest containing six eggs in the Anderson River region April 28. Some individuals have eggs in latter part of June. The eggs may be placed indifferently in cavities of trees, in old nests among the branches, which are relined with moss and feathers, or more rarely among the inequalities in the face of cliffs. When the eggs are deposited in old woodpecker burrows or natural cavities, no nesting material is used other than the chips and powdered wood at the bottom of the cavity. The number of eggs vary from four to eight and, as is the case with many other Owls, the parent begins to set as soon as the first egg is laid; thus each egg is in a different stage of incubation. Both birds take part in the duties of rearing the young, and while the female is covering the eggs the male is near by to defend

BURROWING OWL

Speotyto cunicularia hy

the home. After the young leave the nest the family generally remain together until the following spring.

The species is tame and unsuspicious and may be approached easily without being alarmed; in fact, specimens have been known to return to the same perch after being shot at two or three times. It is a courageous bird and will defend its nest against all intruders. A male once dashed at Dr. Dall and knocked off his hat as he was climbing to the nest; other similar accounts show that the courage displayed on this occasion was not an individual freak, but a common trait of the species.

The Hawk Owl is strictly diurnal, as much so as any of the Hawks, and like some of them often selects a tall stub or dead-topped tree in a comparatively open place for a perch, where it sits in the bright sunlight watching for its prey.

Although the flight is swift and hawk-like, it has nevertheless the soft, noiseless character common to the other Owls, when starting from any high place, such as the top of a tree, it usually pitches down nearly to the ground, and flies off rapidly above the tops of the bushes or high grass, abruptly arising again as it seeks another perch.

The note is a shrill cry which is uttered generally while the bird is on the wing.

DESCRIPTION.

No ear tufts; tail rounded at tips, and indistinctly barred with white. Top of head and back of neck spotted with white and black, or dark brown; a patch of uniform blackish or dark brown on each side of hind neck. Upper parts brown more or less spotted with white; lower parts regularly barred with brown.

Length: 14.75 to 17.50 inches (375 to 445^{mm}); extent, 31 to 33 inches (787 to 838^{mm}); wing, 7.50 to 9 inches (190 to 228^{mm}); tail, 6.80 to 7 inches (172 to 178^{mm}).

Table showing the result of an examination of 1 stomach of the Hawk Owl (Surnia ulula caparoch).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Quebec, Canada	Jan. 15, 1886	.....	.....	Meadow mouse	.....

BURROWING OWL.

Speotyto cunicularia hypogæa.

[Plate 25—Adult.]

The genus to which the Burrowing Owl belongs is peculiar to America, and, although it includes but one species, the latter is divided into several geographical races, which are distributed over a considerable expanse of territory. The typical form (*Speotyto cunicularia*) is found in

southern South America, inhabiting the Argentine Republic, Chile, Paraguay, and probablys outhern Brazil. The North American form (*Speotyto c. hypogæa*) inhabits the plains region of the western part of the continent from British Columbia south to Guatemala, and east to Dakota, Nebraska, Kansas, Indian Territory, and Texas. An isolated race (*Speotyto c. floridana*) inhabits Florida and the adjacent Bahama Islands. Several insular races inhabit the West Indies, where *Speotyto c. guadeloupensis* is found on the islands of Guadeloupe and Nevis, *Speotyto c. dominicensis* on Santo Domingo, and *Speotyto c. amaura* on Antigua.

Except in the northern part of its range, where it is migratory in winter, the species is resident wherever found. Capt. Bendire states that at Fort Walla Walla, Washington, it returns in spring, about the middle of March, the males, as with other species, coming first. The many statements made respecting its supposed habit of hibernation prove to be incorrect, as numbers of careful observers have shown their falsity. Its habit is to forage in calm weather and to collect and store enough food to last through a stormy spell, when it stays in the burrow; it is this latter fact that has given rise to the erroneous idea that it hibernates.

In early twilight, when in search of food, this Owl may be seen hovering in the air after the manner of the Sparrow Hawk, and dropping on its prey when it is discovered.

This species not only appropriates the burrows of the prairie dog and ground squirrel for its home, but also feeds upon the young of the former as well as the adult and young of the latter. That it will kill and eat the larger species of spermophiles has been clearly demonstrated by Capt. Bendire, and the following is an account of his experiment: "In this vicinity [Walla Walla] these owls seem to live to a great extent on that pest of the farmer, Townsend's Ground Squirrel (*Spermophilus richardsoni townsendii* Allen), which would be much more destructive if not kept down by these owls. In order to satisfy myself that they were actually able to kill adult squirrels, I trapped several and placed them alive (they had been caught in a wire trap and were not at all injured) in a room with a pair of these owls. As soon as noticed by the latter one of them would fasten its talons into the squirrel's back, and with a few well-directed strokes of its beak, break the vertebræ of the neck and eat the head of the squirrel, often before the latter was quite dead; yet the remainder of the body was usually left and devoured later. I was surprised to see how easily they killed these squirrels, which made scarcely any resistance. Aside from these, their diet seems to consist of different species of mice, pocket gophers, as well as of crickets, grasshoppers, and occasionally even of fish. It is astonishing how much one of these owls will eat in a day, amounting often to considerably more than their own weight." (Ornithologist and Oologist, vol. VI, 1881, pp. 41, 42.)

Almost all species of mice which are common where the Owl abounds furnish at certain times of the year a considerable proportion of its

food. Nearly all authors who mention its food enumerate mice as more often found in the stomachs examined than any other kind.

Dr. Agersborg gives the following relating to its food habits in southeastern Dakota in winter: "In the winter as many as twenty of these birds may be found nestling together in one hole. They are always at such times abundantly supplied with food. I have found at one time forty-three mice and several shore larks scattered along the run to their common apartment. They forage in fine weather and retreat to their dirty adobes when cold weather threatens." (Auk, vol. II, 1885, p. 284.)

This is one of the few instances in which it has been found to have killed birds, though the rigors of a Dakota winter, with the accompanying difficulty in procuring its favorite food, might be accepted as a partial excuse. Not so the case recorded by William Lloyd from western Texas, where the remains of Bell's vireo, savanna sparrow, and other birds were found in their holes. (Auk, vol. IV, 1887, p. 190.) Mr. Ridgway, Capt. Bendire, and others have found frogs in its burrows among other articles of food. In the case cited by Mr. Ridgway it was a love offering from the male to his mate, and must have been her favorite tidbit, if we may reason from analogy. Both Dr. Coues and Prof. Aughey report finding the remains of lizards among the stomach contents, so that probably, when available, any of the smaller reptiles or batrachians are taken. It is not unlikely that small rattlesnakes are sometimes eaten by this bird. The following, from Mr. C. S. Canfield, shows at any rate that it is fond of snakes: "In the passage leading to the nest there were small scraps of dead animals, such as pieces of the skin of the antelope, half dried and half putrefied, the skin of the coyote, etc.; and near the nest were the remains of a snake that I had killed two days before, a large *Coluber* (?) two feet long. The birds had begun at the snake's head, and had picked off the flesh clean from the vertebræ and ribs for about one-half of its length; the other half of the snake was entire." (American Nat., II, 1869, p. 585.)

In this connection an incident observed by Mr. H. W. Henshaw will be interesting. While on the Tulare plains, in southern California, he saw one of these Owls attack, with every demonstration of hate, a large bull snake (*Pituophis*). The snake was making its way slowly from one hole to another when the bird spied it. Immediately it rose into the air and, swooping down, made a feint as if to seize the reptile in its talons, swerving off, however, when within a foot or so. The snake apparently was more annoyed than frightened, but as rapidly as possible made its way out of the uncomfortable neighborhood. In this instance, at least, the attack by the Owl seems to have been actuated through fear of a hated enemy rather than by any hope of making it a prey; it may be doubted if the strength and courage of the Burrowing Owl are sufficient to enable it cope with a snake of any considerable size.

In the summer and fall, when grasshoppers and crickets are exceed-

southern South America, inhabiting the Argentine Republic, Chile, Paraguay, and probablys outhern Brazil. The North American form (*Speotyto c. hypogæa*) inhabits the plains region of the western part of the continent from British Columbia south to Guatemala, and east to Dakota, Nebraska, Kansas, Indian Territory, and Texas. An isolated race (*Speotyto c. floridana*) inhabits Florida and the adjacent Bahama Islands. Several insular races inhabit the West Indies, where *Speotyto c. guadeloupensis* is found on the islands of Guadeloupe and Nevis, *Speotyto c. dominicensis* on Santo Domingo, and *Speotyto c. amaura* on Antigua.

Except in the northern part of its range, where it is migratory in winter, the species is resident wherever found. Capt. Bendire states that at Fort Walla Walla, Washington, it returns in spring, about the middle of March, the males, as with other species, coming first. The many statements made respecting its supposed habit of hibernation prove to be incorrect, as numbers of careful observers have shown their falsity. Its habit is to forage in calm weather and to collect and store enough food to last through a stormy spell, when it stays in the burrow; it is this latter fact that has given rise to the erroneous idea that it hibernates.

In early twilight, when in search of food, this Owl may be seen hovering in the air after the manner of the Sparrow Hawk, and dropping on its prey when it is discovered.

This species not only appropriates the burrows of the prairie dog and ground squirrel for its home, but also feeds upon the young of the former as well as the adult and young of the latter. That it will kill and eat the larger species of spermophiles has been clearly demonstrated by Capt. Bendire, and the following is an account of his experiment: "In this vicinity [Walla Walla] these owls seem to live to a great extent on that pest of the farmer, Townsend's Ground Squirrel (*Spermophilus richardsoni townsendii* Allen), which would be much more destructive if not kept down by these owls. In order to satisfy myself that they were actually able to kill adult squirrels, I trapped several and placed them alive (they had been caught in a wire trap and were not at all injured) in a room with a pair of these owls. As soon as noticed by the latter one of them would fasten its talons into the squirrel's back, and with a few well-directed strokes of its beak, break the vertebræ of the neck and eat the head of the squirrel, often before the latter was quite dead; yet the remainder of the body was usually left and devoured later. I was surprised to see how easily they killed these squirrels, which made scarcely any resistance. Aside from these, their diet seems to consist of different species of mice, pocket gophers, as well as of crickets, grasshoppers, and occasionally even of fish. It is astonishing how much one of these owls will eat in a day, amounting often to considerably more than their own weight." (Ornithologist and Oologist, vol. VI, 1881, pp. 41, 42.)

Almost all species of mice which are common where the Owl abounds furnish at certain times of the year a considerable proportion of its

food. Nearly all authors who mention its food enumerate mice as more often found in the stomachs examined than any other kind.

Dr. Agersborg gives the following relating to its food habits in southeastern Dakota in winter: "In the winter as many as twenty of these birds may be found nestling together in one hole. They are always at such times abundantly supplied with food. I have found at one time forty-three mice and several shore larks scattered along the run to their common apartment. They forage in fine weather and retreat to their dirty adobes when cold weather threatens." (Auk, vol. II, 1885, p. 284.)

This is one of the few instances in which it has been found to have killed birds, though the rigors of a Dakota winter, with the accompanying difficulty in procuring its favorite food, might be accepted as a partial excuse. Not so the case recorded by William Lloyd from western Texas, where the remains of Bell's vireo, savanna sparrow, and other birds were found in their holes. (Auk, vol. IV, 1887, p. 190.) Mr. Ridgway, Capt. Bendire, and others have found frogs in its burrows among other articles of food. In the case cited by Mr. Ridgway it was a love offering from the male to his mate, and must have been her favorite tidbit, if we may reason from analogy. Both Dr. Coues and Prof. Aughey report finding the remains of lizards among the stomach contents, so that probably, when available, any of the smaller reptiles or batrachians are taken. It is not unlikely that small rattlesnakes are sometimes eaten by this bird. The following, from Mr. C. S. Canfield, shows at any rate that it is fond of snakes: "In the passage leading to the nest there were small scraps of dead animals, such as pieces of the skin of the antelope, half dried and half putrefied, the skin of the coyote, etc.; and near the nest were the remains of a snake that I had killed two days before, a large *Coluber* (?) two feet long. The birds had begun at the snake's head, and had picked off the flesh clean from the vertebræ and ribs for about one-half of its length; the other half of the snake was entire." (American Nat., II, 1869, p. 585.)

In this connection an incident observed by Mr. H. W. Henshaw will be interesting. While on the Tulare plains, in southern California, he saw one of these Owls attack, with every demonstration of hate, a large bull snake (*Pituophis*). The snake was making its way slowly from one hole to another when the bird spied it. Immediately it rose into the air and, swooping down, made a feint as if to seize the reptile in its talons, swerving off, however, when within a foot or so. The snake apparently was more annoyed than frightened, but as rapidly as possible made its way out of the uncomfortable neighborhood. In this instance, at least, the attack by the Owl seems to have been actuated through fear of a hated enemy rather than by any hope of making it a prey; it may be doubted if the strength and courage of the Burrowing Owl are sufficient to enable it cope with a snake of any considerable size.

In the summer and fall, when grasshoppers and crickets are exceed-

ingly abundant on the Western plains, the Burrowing Owl feeds almost exclusively on such food. Like the Sparrow Hawk, and even others of the larger diurnal birds of prey, this little Owl will chase and devour grasshoppers until its stomach is distended to the utmost. In all the stomachs the writer has examined, which were collected mainly in Dakota and Nebraska, the remains of grasshoppers or crickets were always found.

Prof. Aughey, whose investigations were carried on during the season when these insects were most abundant, found that the larger proportion of the stomach contents consisted of their remains. Beetles, dragon-flies, and the larvæ of various kinds of insects are eaten occasionally by this species.

William Lloyd writes that in several specimens dissected at Paint Rock, Tex., remains of myriapods were found. Other cases have come to our notice where it was seen feeding on scorpions and centipeds. A gentleman in Arizona found a pile of fragments of scorpions on the corner of the roof where a Burrowing Owl habitually carried its prey to devour it.

The writer found a number of molecricket scorpions (*Datames sulfurcus*) in the stomach of a Burrowing Owl secured in Walker Pass, Cal.

It will thus be seen that there is good reason for the almost universal belief in the beneficial habits of the Burrowing Owl. It destroys immense numbers of noxious insects, mice, ground squirrels, as well as scorpions and centipeds, and rarely molests the smaller insectivorous birds. There would seem to be no excuse for a failure to effectually protect it by law. Bounties offered for Hawks and Owls, however, often result in the destruction of great numbers of this species, so valuable to the agriculturists. More shameful still is the fact that it has been slaughtered and sold for millinery purposes.

Mr. Clark P. Streator informs us that in the year 1887 E. F. Lorquin, of San Francisco, Cal., received for millinery purposes, 500 Burrowing Owls and 1,000 specimens of other species of Owls and Hawks, besides hundreds of other birds.

The Burrowing Owl is terrestrial, inhabiting the treeless, grassy plains and deserts, dwelling in the abandoned burrows of various species of mammals as well as those of the land tortoises and larger lizards. Among the mammals whose deserted burrows are used by this bird may be mentioned prairie dogs, spermophiles, woodchucks, viscachas (South America), wolves, foxes, badgers, skunks, and armadillos. It will be seen from this extensive list that the Owl seldom wants for a home, as one or more of the above species are found in some part of its range. Various authors have stated that the bird sometimes excavates a burrow for itself, but there is no ground for the statement, for in no instance has it been observed in the work of excavation. It does not even share the habit of the rodents, which, after severe showers, carry out and place beyond the entrance of the burrow the loose earth which has washed in.

This species is strictly crepuscular and diurnal, and it possesses as keen vision and acute hearing as any of the Hawks. It is frequently in motion on the brighest days, capturing its prey or evading its pursuer with the greatest ease. Except in the breeding season it probably feeds more in early twilight than at other times. In many localities it is nearly impossible to approach within gun range, even where there is more or less shrubbery to conceal the collector, the noise which is necessarily made being sufficient to warn the bird of its danger. On the pampas in South America, according to W. B. Barrows (Standard Natural History), it is more nocturnal and does not feed or even move around much during the day. It generally remained a short distance inside the entrance of its burrow or sat on some low bush or mound. Neither was it difficult to approach in the daytime nor would it fly unless the intruder passed in close proximity. In the evening it was much more wary and would fly at the slightest noise, at the same time repeating its alarm note, which also warned the viscachas of danger. The alarm note, or note of rage, is a rattling, hissing sound which, according to Capt. Bendire, closely resembles that made by the rattlesnake.

The love notes of this Owl are peculiar and do not resemble those of any other species. They are produced in early twilight, not while the bird is on the wing but while it sits near the hole, and are repeated rather regularly for an hour or more.

Nathaniel H. Bishop likens the note to the sound produced by a frog; Dr. Coues states that the notes are curiously similar to those of the cuckoo, so much so that more than one observer has been deceived; and Capt. Bendire says they resemble those of the European cuckoo. The first observation refers to the South American species, while the last two are based on notes from the Western plains, which may account in part for the different interpretation of the sound.

The flight is rather laborious, irregular, and somewhat jerky, and is seldom of long duration. The bird rarely rises high in the air, but passes noiselessly along the ground, and when alighting drops very much after the manner of the woodcock. As a rule, when approached, instead of diving into and retreating to the far end of the burrow, it takes wing to some neighboring mound, from which it will watch the intruder. If wounded, it will scramble into a hole, from which it is difficult to retrieve. If approached gradually, and when at some distance, it will go through a series of curious and ludicrous antics. Its actions suggest those of a young chick which stands for the first time before a brother combatant. It will make a low and profound bow, so that the throat nearly touches the ground; then it stands motionless bolt upright for a moment, with head thrown forward; then come a series of side movements of the head, interspersed with bowing and nodding, with now and then a complete facing to one side or the other. The peculiar combination of long legs, short tail, and round, compact head adds considerably to the grotesqueness of the pantomime.

Many stories have been fabricated in regard to the association of the prairie dog, Owl, and rattlesnake, some of which are unequaled among fairy tales. The whole story is ably told by Dr. Coues in the 'Birds of the Northwest.' After giving a rather exaggerated account of the relations existing between the reptile, mammal, and bird, according to the views of some, he then explains exactly how matters stand in the colony. The following is his account:

"The case is further complicated by the introduction of the rattlesnakes; and no little pure bosh is in type respecting the harmonious and confidential relations imagined to subsist between the trio, which, like the 'happy family' of Barnum, lead Utopian existences. According to the dense bathos of such nursery tales, in this underground Elysium the snakes give their rattles to the puppies to play with, the old dogs cuddle the Owlets, and farm out their own litters to the grave and careful birds; when an Owl and a dog come home, paw-in-wing, they are often mistaken by their respective progeny, the little dogs nosing the Owls in search of the maternal font and the old dogs left to wonder why the baby Owls will not nurse. It is a pity to spoil a good story for the sake of a few facts, but, as the case stands, it would be well for the Society for the Prevention of Cruelty to Animals to take it up. First, as to the reptiles, it may be observed that they are, like other rattlesnakes, dangerous, venomous creatures; they have no business in the burrows, and are after no good when they do enter. They wriggle into the holes, partly because there is no other place for them to crawl into on the bare, flat plain, and partly in search of Owls' eggs, Owlets, and puppies to eat. Next, the Owls themselves are simply attracted to the villages of the prairie dogs as the most convenient places for shelter and nidification, where they find eligible ready-made burrows and are spared the trouble of digging for themselves. Community of interest makes them gregarious to an extent unusual among rapacious birds; while the exigencies of life on the plains cast their lot with the rodents. That the Owls live at ease in the settlement and on familiar terms with their four-footed neighbors is an undoubted fact; but that they inhabit the same burrows or have any intimate domestic relations, is quite another thing. It is no proof that the quadruped and the birds live together that they are often seen to scuttle at each other's heels into the same hole when alarmed; for in such case the two simply seek the nearest shelter, independently of each other. The probability is that young dogs often furnish a meal to the Owls, and that, in return, the latter are often robbed of their eggs; while certainly the young of both and the Owls' eggs are eaten by the snakes." (p. 324.)

The first two weeks in April, earlier or later, according to latitude, is the usual time for this species to begin to deposit its eggs. Capt. Bendire thinks that the period of incubation is about three weeks, and that both birds assist in hatching the eggs. The young Owls make their appearance at the mouth of the hole in the latter part of May.

The eggs are usually five to eight in number, though sets of eleven have been taken. When a nest exists, for the eggs are sometimes placed on the bare earth, it is usually composed of a small quantity of grass or finely broken cow or horse dung, and is situated at the end of the burrow in a somewhat enlarged chamber. The distance from the entrance of course depends on the individual burrows, which vary from 4 to 10 feet in length. A nest which Mr. Ridgway dug out, was situated 8 feet from the entrance and 4 feet below the surface. (U. S. Geol. Explor. of the Fortieth Paral., King, vol. IV, 1877, p. 574.)

DESCRIPTION.

Lower leg more than twice as long as middle toe and about half as long as tail. Above, earthy brown, with buffy spotting and barring. Below, ground color, distinctly buffy, feathers covering base of lower surface of tail unspotted.

Length: 9 to 11 inches (228 to 280^{mm}); extent, 22.50 to 23.50 inches (572 to 597^{mm}); wing, 5.80 to 7.20 inches (147 to 183^{mm}); tail, 3.15 to 3.50 inches (80 to 89^{mm}).

Table showing the results of examinations of 32 stomachs of the Burrowing Owl (Speotyto cunicularia hypogœa).

Locality.	Date.	Poultry or game birds	Other birds.	Mammals.	Miscellaneous.
Fort Buford, N. Dak	Sept. 29, 1887				Grasshoppers.
Wayne County, Nebr.	June —, 1868				62 insects.
Do	do				Lizard, 30 insects.
Pierce County, Nebr.	do				49 locusts, 17 other insects.
Do	do			Prairie dog	46 locusts, 10 other insects.
Do	do				54 locusts, 8 other insects.
Wayne County, Nebr.	July —, 1869			Mouse	65 insects.
Sydney, Cheyenne County, Nebr.	June —, 1875				59 locusts, 3 other insects.
Ogalalla, Keith County, Nebr.	Sept. —, 1876			Mouse	51 locusts, 12 other insects.
Do	do				58 locusts, 4 other insects.
Woodland, Cal.	May 24, 1886				4 grasshoppers, 6 other insects.
Pierre, S. Dak.	May 21, 1888				Beetle.
Do	May 30, 1888				3 grasshoppers, 7 crickets, 2 beetles.
Reeder, Kans	July —, 1888				Grasshopper, other insects.
Cheyenne, Wyo	Aug. 21, 1888				10 grasshoppers, 45 beetles, other insects.
Do	Aug. 23, 1888				35 grasshoppers, 20 beetles, etc.
Do	do				15 grasshoppers, 6 beetles.
Phœnix, Ariz	May 7, 1889				Insect remains.
Do	May 9, 1889				Scorpion, crickets, beetles.
Albuquerque, N. Mex.	July 16, 1889				20 beetles, 2 crickets, 1 centiped.
Big Butte, Idaho	July 18, 1890				Insects, scorpions.
Del Rio, Tex	Jan. 31, 1890				Small insects.
Verde Valley, Ariz.	Aug. 6, 1884				Grasshoppers.

Many stories have been fabricated in regard to the association of the prairie dog, Owl, and rattlesnake, some of which are unequaled among fairy tales. The whole story is ably told by Dr. Coues in the 'Birds of the Northwest.' After giving a rather exaggerated account of the relations existing between the reptile, mammal, and bird, according to the views of some, he then explains exactly how matters stand in the colony. The following is his account:

"The case is further complicated by the introduction of the rattlesnakes; and no little pure bosh is in type respecting the harmonious and confidential relations imagined to subsist between the trio, which, like the 'happy family' of Barnum, lead Utopian existences. According to the dense bathos of such nursery tales, in this underground Elysium the snakes give their rattles to the puppies to play with, the old dogs cuddle the Owlets, and farm out their own litters to the grave and careful birds; when an Owl and a dog come home, paw-in-wing, they are often mistaken by their respective progeny, the little dogs nosing the Owls in search of the maternal font and the old dogs left to wonder why the baby Owls will not nurse. It is a pity to spoil a good story for the sake of a few facts, but, as the case stands, it would be well for the Society for the Prevention of Cruelty to Animals to take it up. First, as to the reptiles, it may be observed that they are, like other rattlesnakes, dangerous, venomous creatures; they have no business in the burrows, and are after no good when they do enter. They wriggle into the holes, partly because there is no other place for them to crawl into on the bare, flat plain, and partly in search of Owls' eggs, Owlets, and puppies to eat. Next, the Owls themselves are simply attracted to the villages of the prairie dogs as the most convenient places for shelter and nidification, where they find eligible ready-made burrows and are spared the trouble of digging for themselves. Community of interest makes them gregarious to an extent unusual among rapacious birds; while the exigencies of life on the plains cast their lot with the rodents. That the Owls live at ease in the settlement and on familiar terms with their four-footed neighbors is an undoubted fact; but that they inhabit the same burrows or have any intimate domestic relations, is quite another thing. It is no proof that the quadruped and the birds live together that they are often seen to scuttle at each other's heels into the same hole when alarmed; for in such case the two simply seek the nearest shelter, independently of each other. The probability is that young dogs often furnish a meal to the Owls, and that, in return, the latter are often robbed of their eggs; while certainly the young of both and the Owls' eggs are eaten by the snakes." (p. 324.)

The first two weeks in April, earlier or later, according to latitude, is the usual time for this species to begin to deposit its eggs. Capt. Bendire thinks that the period of incubation is about three weeks, and that both birds assist in hatching the eggs. The young Owls make their appearance at the mouth of the hole in the latter part of May.

The eggs are usually five to eight in number, though sets of eleven have been taken. When a nest exists, for the eggs are sometimes placed on the bare earth, it is usually composed of a small quantity of grass or finely broken cow or horse dung, and is situated at the end of the burrow in a somewhat enlarged chamber. The distance from the entrance of course depends on the individual burrows, which vary from 4 to 10 feet in length. A nest which Mr. Ridgway dug out, was situated 8 feet from the entrance and 4 feet below the surface. (U. S. Geol. Explor. of the Fortieth Paral., King, vol. IV, 1877, p. 574.)

DESCRIPTION.

Lower leg more than twice as long as middle toe and about half as long as tail. Above, earthy brown, with buffy spotting and barring. Below, ground color, distinctly buffy, feathers covering base of lower surface of tail unspotted.

Length: 9 to 11 inches (228 to 280^{mm}); extent, 22.50 to 23.50 inches (572 to 597^{mm}); wing, 5.80 to 7.20 inches (147 to 183^{mm}); tail, 3.15 to 3.50 inches (80 to 89^{mm}).

Table showing the results of examinations of 32 stomachs of the Burrowing Owl (Speotyto cunicularia hypogœa).

Locality.	Date.	Poultry or game birds	Other birds.	Mammals.	Miscellaneous.
Fort Buford, N. Dak	Sept. 29, 1887				Grasshoppers.
Wayne County, Nebr.	June —, 1868				62 insects.
Do	do				Lizard, 30 insects.
Pierce County, Nebr.	do				49 locusts, 17 other insects.
Do	do			Prairie dog	46 locusts, 10 other insects.
Do	do				54 locusts, 8 other insects.
Wayne County, Nebr.	July —, 1869			Mouse	65 insects.
Sydney, Cheyenne County, Nebr.	June —, 1875				59 locusts, 3 other insects.
Ogalalla, Keith County, Nebr.	Sept. —, 1876			Mouse	51 locusts, 12 other insects.
Do	do				58 locusts, 4 other insects.
Woodland, Cal	May 24, 1886				4 grasshoppers, 6 other insects.
Pierre, S. Dak	May 21, 1888				Beetle.
Do	May 30, 1888				3 grasshoppers, 7 crickets, 2 beetles.
Reeder, Kans	July —, 1888				Grasshopper, other insects.
Cheyenne, Wyo	Aug. 21, 1888				10 grasshoppers, 45 beetles, other insects.
Do	Aug. 23, 1888				35 grasshoppers, 20 beetles, etc.
Do	do				15 grasshoppers, 6 beetles.
Phœnix, Ariz	May 7, 1889				Insect remains.
Do	May 9, 1889				Scorpion, crickets, beetles.
Albuquerque, N. Mex.	July 16, 1889				20 beetles, 2 crickets, 1 centiped.
Big Butte, Idaho	July 18, 1890				Insects, scorpions.
Del Rio, Tex	Jan. 31, 1890				Small insects.
Verde Valley, Ariz	Aug. 6, 1884				Grasshoppers.

Table showing the results of examinations of 32 stomachs of the Burrowing Owl (Speotyto cunicularia hypogæa)—Continued.

Locality	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Verde Valley, Ariz	Aug. 6, 1884				Grasshoppers, other insects.
Wilcox, Ariz	April 9, 1885				3 small lizards.
Do	May 1, 1885				Lizards, insects.
Camp Verde, Ariz	Aug. 26, 1886				Insects.
Do	do				Empty.
Walker Pass, Cal	July 2, 1891				5 grasshoppers, 7 molecricket scorpions.
Mohave Desert, Cal	Jan. 15, 1891				Caterpillars and beetles.
Harrison, S. Dak	Sept. 14, 1891				2 crickets.
Do	Sept. 28, 1891				6 crickets.

SUMMARY.—Of 32 stomachs examined, 3 contained small mammals; 3, lizards; 3, scorpions; 1, a centiped; 30, insects; and 1 was empty.

PYGMY OWL.

Glaucidium gnoma.

The Pygmy Owls, with the exception of the Little Elf Owl, are the smallest of all the North American species. Of these interesting little birds there are two species and two geographical races. The distribution of three is given below, and the other, the Ferruginous Pygmy Owl, will be treated elsewhere under a separate head.

The Pygmy Owl (*Glaucidium gnoma*) inhabits the western United States (except the northwest coast), ranging east to Colorado and New Mexico, and south to the highlands of Mexico.

The California Pygmy Owl (*Glaucidium g. californicum*) inhabits the heavy rainfall area, occurring west of the mountains from British Columbia south to San Francisco.

Hoskin's Pygmy Owl (*Glaucidium g. hoskinsii*) inhabits the southern part of the peninsula of Lower California.

The Pygmy Owl is probably a resident wherever found, except that it may leave the higher mountains and descend to the lower country on the advent of cold weather. Its food consists mainly of insects, though it also destroys small mammals, birds, reptiles, and batrachians. It is surprising what comparatively large mammals and birds it will sometimes seize. Capt. Bendire mentions that a comrade shot one which had seized a large-sized pocket gopher, and, as elsewhere mentioned, he found a full-grown Say's ground squirrel in its nest, a mammal fully twice the weight of the bird.

Dr. J. C. Merrill gives the following relating to its food habits: "One captured February 21 had just struck at a robin and was struggling with it on the ground. It is said to be especially abundant in summer at Modoc Point [20 miles south of Fort Klamath, Oregon], and to feed upon a lizard that is common there; I have also found fragments of field mice

in the stomachs. Insects, however, and especially grasshoppers, constitute the greater part of its food when they can be obtained. When the Owl is searching for these the smaller birds pay little attention to it, even if it happens to alight near them." (Auk, vol. v, 1888, p. 146.)

Capt. Bendire mentioned an individual at Fort Klamath which occupied a willow branch over a stream for the purpose, he thought, of watching for frogs, which were common at that spot.

Mr. C. H. Townsend, speaking of this Owl and its food in northern California, says: "It is rather diurnal in its movements and may be seen long before sunset engaged in its search for small birds, upon which it seems to subsist largely, flying closely to the ground along the borders of tule marshes. It doubtless kills marsh wrens and small sparrows, as such birds were often noticed near the hunting grounds of the owl. One Pygmy Owl which I shot had a freshly-killed snowbird (*Junco oregonus*) in its claws." (Proc. U. S. Nat. Mus., vol. x, 1887, p. 204.)

Very little is known of its nesting habits for, besides the nest mentioned by Mr. J. K. Lord, on Vancouver Island, which contained two eggs, in the early part of May, three only have been found. One of these was found by Mr. George H. Ready, on June 8, 1876, near Santa Cruz, Cal., and was situated in a woodpecker's hole in an isolated poplar tree some 75 feet from the ground. It contained three eggs, which were deposited on a mass of small dry twigs and feathers, presumably an old nest of Parkman's wren. This nest was described independently both by Capt. Bendire (Proc. Boston Soc. Nat. Hist., vol. xix, 1879, p. 132) and Mr. W. C. Cooper (Bull. Nutt. Ornith. Club, vol. iv, 1879, p. 86). Another nest was found at Fort Klamath, Oregon, June 10, 1883, by one of the soldiers, during the absence of Capt. Bendire, who, on his return, June 25, had it examined and found four young from a week to ten days old. As in the previous case, the cavity containing the nest was a deserted woodpecker's hole, about 20 feet from the ground, and in a tree standing within a few feet of the target butt, which was in daily use. The cavity was well filled with feathers and also contained a full-grown chipmunk (*Tamias lateralis*) as food for the young (Bull. Nutt. Ornith. Club, vol. viii, 1883, p. 242, and Auk, vol. v, 1888, p. 370). The third nest, like the other two, was placed in an old woodpecker's hole, and was found in La Plata County, Colo., by C. F. Morrison, in June, and contained three young (Ornithologist and Oologist, vol. xiii, 1888, p. 115).

This little Owl is diurnal in its habits, feeding and flying about in the bright sunshine, though it is more common in the early dusk and morning. Mr. Henshaw says it is fond of taking its station early in the morning on the top of an old stub, that it may enjoy the warmth of the sun's rays. In most places it is more or less solitary, though in New Mexico Mr. Henshaw found it extremely sociable, and in the fall it was usually met with in companies.

It is tame and unsuspicious and may be decoyed from a considerable distance by imitating its call note, to which it responds at once. It is confined mostly to wooded districts, though occasionally it is found some distance from timber. It hides in the pines or other thick foliage, where it sits upright near the trunk and is practically invisible to the observer.

The flight is not very much like that of other Owls, but resembles that of the Sparrow Hawk to some extent, and is not altogether noiseless. The love notes, according to Capt. Bendire, are somewhat musical, although they resemble to some extent those of the mourning dove.

As a rule the small birds pay little or no attention to the presence of this diminutive Owl, as they do to other species, but the following note from Mr. C. A. Allen shows the rule has exceptions: "There were fighting the Owl one pair of *Tyrannus verticalis*, one pair of Bullock's Orioles, one pair of Bewick's Wrens, three Banded Tits (*Chamæa fasciata*), one pair of *Pipilo oregonus*, one pair of *P. crissalis*, and about twenty Blackbirds (*Scolecophagus cyanocephalus*). The bravest birds of the troop were Bewick's Wren and Bullock's Oriole, which kept darting at the Owl's head as it sat on the ground devouring a young Blackbird." (Bull. Nutt. Ornith. Club, vol. III, p. 193.)

DESCRIPTION.

Size very small; no ear tufts. Lower leg not longer than middle toe, densely feathered; tail more than half as long as wing, tip rounded. Sides of breast brownish, more or less spotted with paler; tail bands always white, the interspaces blackish; top of head speckled or dotted whitish. Below, striped with blackish; back slaty grayish.

Length: 6.50 to 7.50 inches (165 to 190^{mm}); extent, 14.50 to 15.50 inches (368 to 393^{mm}); wing, 3.40 to 4 inches (86 to 101^{mm}); tail, 2.40 to 2.80 inches (60 to 70^{mm}).

Table showing the results of examinations of 6 stomachs of the Pygmy Owl (Glaucidium gnoma).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Ogden, Utah	Oct. 5, 1888	.....	Small bird	.....	
San Pedro, N. Mex.	July 6, 1889	.....	.....	White-footed mouse.	
Do	Do	.....	.....	.....	Grasshopper.
Prescott, Ariz	Mar. 21, 1884	.....	.....	.....	Empty.
Fossil Creek, Ariz	Mar. 29, 1886	.....	.....	.....	Lizards.
Mogollon Mts., Ariz.	July 26, 1887	.....	.....	.....	Empty.

SUMMARY.—Of 6 stomachs examined, 1 contained a small bird; 1, a mouse; 1, lizards; 1, an insect, and 2 were empty.

FERRUGINOUS PYGMY OWL.

Glaucidium phalænoides.

The Ferruginous Pygmy Owl inhabits the whole of tropical America, except the West Indies, ranging north to southern Texas and Arizona. This beautiful little Owl was added to our fauna in 1872, by Capt. Bendire, who captured several specimens in the dense mesquit thickets bordering Rillito Creek, in the vicinity of Tucson, Ariz. As the first specimen was taken January 24, it is evidently a resident wherever found.*

Very little has been written on the subject of the food of this species, but undoubtedly it is of much the same quality as that of other members of the genus. A specimen captured by Dr. E. A. Mearns at Casa Grande, Ariz., May 10, 1885, contained the remains of a lizard. In South America it is reported as sometimes feeding on young chickens.

Little is known of its nesting habits, but they are undoubtedly similar to those of the Pygmy Owl. Mr. George B. Sennett gives the first description of the eggs in the Auk (vol. VI, 1889, p. 70). The nest was in a hollow tree and contained but a single egg, which was very close to the size of that of the elf owl. In 1872 Captain Bendire found two fledglings in a hollow mesquit tree in southern Arizona, which at the time were thought to be young Elf Owls, but at present he is inclined to refer them to this species, as the first-mentioned Owl almost universally breeds in the hollows of the giant cactus.

Like the other Pygmy Owls, this species is diurnal in its habits, flying about and capturing its prey in the bright sunlight.

"His note was a loud *cuck* repeated several times as rapidly as twice each second. At each utterance the bird jerked his tail and threw back his head. Occasionally a low *chuck*, audible for only a short distance, replaced the usual call."—(F. Stephens in Bull. Nutt. Ornith. Club, vol. VIII, 1883, p. 27.)

DESCRIPTION.

Similar to the Pygmy Owl in size and general character. Sides of breast brown or rufous, without traces of lighter markings; tail bands varying from white to rufous, the interspaces varying from grayish to blackish; top of head narrowly streaked with whitish or pale rusty.

Length: 6.50 to 7 inches (165 to 178^{mm}); extent, 14.50 to 15.50 inches (368 to 393^{mm}); wing, 3.50 to 4.60 inches (89 to 116^{mm}); tail, 2.20 to 3.50 inches (55 to 89^{mm}).

* The writer found this species quite common at New River, thirty-five miles NNW. of Phœnix, Ariz., in June, 1892. Two specimens were secured and several others observed among the mesquit and other thick shrubbery scattered through the groves of giant cactus.

ELF OWL.

Micropallas whitneyi.

This little Owl, the smallest known species in North America, was first discovered by Dr. J. G. Cooper, at Fort Mohave, Ariz., on April 26, 1861, and described by him in the Proceedings of the California Academy of Natural Sciences, 1861, p. 118. At present it is known to inhabit the southwestern United States, ranging from central Arizona (Prescott), southeastern California, and Lower California, southward to southern Mexico. In parts of Arizona it is very common, for Mr. W. E. D. Scott says: "On one occasion while collecting with Mr. F. Stephens, near Fuller's ranch [near Tucson], about the last of May, 1883, we secured, with no particular exertion, over twenty of these birds and a dozen or more nests of eggs in about six hours." (Auk, vol. III, 1886, p. 424.)

It almost invariably breeds in deserted woodpeckers' holes, in the giant cactuses, though a few nests have been found in hollow mesquit or other trees. The eggs are from two to five in number, three being the most common, and the extremes rare. Fresh sets are found from the first week in May to the third week in June, which latter date is late for Owls generally to breed. Except during the breeding season when the females are found in the nest holes, the species lives in the thick brush and thickets through the day. Evidence goes to show that during the breeding season the males are more or less gregarious, keeping in willow copses or other thickets.

The species is nocturnal in its habits, not emerging from its retreat until twilight is well advanced, when it may be seen flying about in the fading light. It is said to have several notes which are heard more often in the early evening and again about daybreak.

The following from Mr. F. Stephens, which was published by Mr. Brewster, is interesting in adding to our knowledge of the habits of this comparatively little known bird: "I was walking past an elder bush in a thicket when a small bird started out. Thinking it had flown from its nest I stopped and began examining the bush, when I discovered a Whitney's Owl sitting on a branch with its side toward me and one wing held up, shield-fashion, before its face. I could just see its eyes over the wing, and had it kept them shut I might have overlooked it, as they first attracted my attention. It had drawn itself into the smallest possible compass so that its head formed the widest part of its outline. I moved around a little to get a better chance to shoot, as the brush was very thick, but whichever way I went the wing was always interposed, and when I retreated far enough for a fair shot I could not tell the bird from the surrounding bunches of leaves. At length, losing patience, I fired at random and it fell. Upon going to pick it up I was surprised to find another, which I had not seen before,

but which must have been struck by a stray shot." (Bull. Nutt. Ornith. Club, vol. VIII, p. 28.)

Little or nothing is known of the food of this species, though probably it feeds on insects and the smaller rodents.

DESCRIPTION.

Smallest Owl inhabiting the United States. Lower leg longer than middle toe, scantily haired; tail less than half as long as wing, straight across the end. No ear tufts. Above, grayish or brownish, finely mottled with darker and indistinctly speckled with pale rusty; tail brownish, covered by five or six narrow, usually interrupted, bands of pale brown or rusty; eyebrows, space in front of eyes and under chin, white. Below white, marked with longitudinal blotches of brown or rusty.

Length: 5.50 to 6.25 inches (140 to 159^{mm}); extent, 14.25 to 15.25 inches (362 to 387^{mm}); wing, 4 to 4.40 inches (101 to 111^{mm}); tail, 1.90 to 2.30 inches (47 to 58^{mm}).

Table showing the results of examinations of three stomachs of the Elf Owl (Micropallas whitneyi).

Locality.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Tanque Verde, Ariz	Mch. 30,1890	.....	.....	Small mammal	20 beetles.
Fort Lowell, Ariz	Apr. 20,1890	.....	.....	.....	19 beetles, grasshoppers.
Fort Huachuca, Ariz	May 7,1892	.....	.....	.....	Beetle remains.

INDEX.

	Page.
Accipiter atricapillus	43–46
cooperi	38–43
velox	32–37
Aplomado Falcon	114–115
distribution	114
food	115
nesting habits	115
Aquila chrysaëtos	93–97
Archibuteo ferrugineus	91–93
lagopus sancti-johannis	86–91
Asio accipitrinus	145–149
wilsonianus	140–145
Asturina plagiata	85–86
Audubon's Caracara	128–129
distribution	128
food	128–129
nesting habits	129
table of stomach contents	129
Bald Eagle	97–101
beneficial qualities	98
distribution	97
food	97–100
habits	101
nesting habits	100
table of stomach contents	101
Barn Owl	132–139
distribution	132–133
food	133–137
mammals and birds found in stomachs	136
nesting habits	137–138
table of stomach contents	139
Barred Owl	150–156
distribution	150
food	150–152
habits	153–154
mammals and birds found in stomachs	152
nesting habits	152–153
table of stomach contents	154–156
Broad-winged Hawk	79–83
distribution	79
food	79–81
mammals and birds found in stomachs	81
nesting habits	81
table of stomach contents	82–83

Page.
Bubo virginianus 174–182
arcticus 174
saturatus 174
subarcticus 174
Burrowing Owl 189–196
beneficial qualities 192
destruction for millinery purposes 192
distribution 189–190
food 190–192
nesting and other habits 192–195
table of stomach contents 195–196
Buteo abbreviatus 71
albicaudatus 72
borealis 48–62
calurus 52
costaricensis 52
harlani 52
kriderii 52
lucasanus 52
brachyurus 83–84
cooperi 79
latissimus 79–83
lineatus 62–70
alleni 62
elegans 62
swainsoni 72–79
Buzzard, Cooper's 79
Caracara, Audubon's 128–129
Circus hudsonius 26–32
Cooper's Buzzard 79
Cooper's Hawk 38–43
distribution 38
food 38–40
mammals and birds found in stomachs 40
nesting habits 40
table of stomach contents 41–43
Duck Hawk 106–109
birds found in stomachs 106
distribution 106
food 106–108
nesting habits 108–109
table of stomach contents 109
Eagle, Bald 97–101
Golden 93–97
Elanoides forficatus 20–22
Elanus leucurus 23
Elf Owl 200–201
Everglade Kite 25–26
distribution 25
food 25–26
nesting habits 26
Falco columbarius 109–113
suckleyi 109
fusco-cœrulescens 114–115
islandus 102–103

Page
Falco mexicanus 104–106
peregrinus anatum 106–109
pealei 106
richardsoni 114
rusticolus 102–103
gyrfalco 102–103
obsoletus 102
sparverius 115–127
Falcon, Aplomado 114–115
Prairie 104–106
Ferruginous Pygmy Owl 199
Ferruginous Roughleg 91–93
distribution 91–92
food 92
nesting habits 92–93
table of stomach contents 93
Fish Hawk 130–132
Flammulated Screech Owl 173–174
distribution 173
food 174
habits 174
Glaucidium gnoma 196–198
californicum 196
hoskinsii 196
phalænoides 199
Golden Eagle 93–97
distribution 93
food 93
nesting habits 96
table of stomach contents 97
Goshawk 43–46
distribution 43
food 43–45
mammals and birds found in stomachs 45
nesting habits 45–46
table of stomach contents 46
Goshawk, Mexican 85–86
Great Gray Owl 157–158
distribution 157
food 157–158
mammals found in stomachs 158
nesting habits 158
table of stomach contents 158
Great Horned Owl 174–182
beneficial qualities 176
breeding habits 178–179
destructive to poultry 174
distribution 174
food 174–178
habits in captivity 179
mammals and birds found in stomachs 177–178
table of stomach contents 180–182
Gyrfalcons 102–103
Haliæetus leucocephalus 97–101
Harris's Hawk 47–48

	Page.
Harris's Hawk distribution	47
food	47
nesting habits	47
table of stomach contents	48
Hawk, Broad-winged	79–83
Cooper's	38–43
Duck	106–109
Ferruginous Rough-leg	91–93
Fish	130–132
Harris's	47–48
Marsh	26–32
Mexican Black	84–85
Pigeon	109–113
Red-shouldered	62–70
Red-tailed	48–62
Rough-legged	86–91
Sharp-shinned	32–37
Short-tailed	83–84
Sparrow	115–127
Swainson's	72–79
White-tailed	72
Zone-tailed	71–72
Hawk Owl	187–189
breeding range	188
distribution	187–188
food	188
nesting habits	188–189
table of stomach contents	189
Hawks, enumeration of stomachs examined	17
beneficial species	11
harmful species	11, 15
Kite, Everglade	25–26
Mississippi	24–25
Swallow-tailed	20–22
White-tailed	23
Long-eared Owl	140–145
beneficial qualities	140
distribution	140
food	140
mammals and birds found in stomachs	141
nesting habits	141–142
summary of contents of 200 pellets	136
table of stomach contents	143–145
Marsh Hawk	26–32
beneficial qualities in the South	28
distribution	26–27
economic value	29
food	27
mammals and birds found in stomachs	29
nesting habits	28
table of stomach contents	30–32
Measurements, explanation of	18
Megascops asio	163–173
aikeni	163

Page.
Megascops asio bendirei 163
floridanus 163
kennicottii 163
macfarlanei 163
mccallii 163
maxwelliæ 163
saturatus 163
trichopsis 163
flammeolus 173–174
idahoensis 173
Merlin, Richardson's 114
Mexican Black Hawk 84–85
distribution 84
food 84
nesting habits 84–85
table of stomach contents 85
Mexican Goshawk 85–86
distribution 85
food 85
nesting habits 86
Micropallas whitneyi 200–201
Mississippi Kite 24–25
distribution 24
food 24
nesting habits 24
table of stomach contents 25
Nyctala acadica 160–162
tengmalmi richardsoni 159
Nyctea nyctea 182–187
Osprey 130–132
distribution 132
food 130
manner of capturing prey 130–131
nesting habits 131
table of stomach contents 132
Owl, Barn 132–139
Barred 150–156
Burrowing 189–196
Common Screech 163–173
Ferruginous Pygmy 199
Flammulated Screech 173–174
Great Gray 157–158
Great Horned 174–182
Hawk 187–189
Long-eared 140–145
Pygmy 196–198
Richardson's 159
Saw-whet 160–162
Short-eared 145–149
Snowy 182–187
Spotted 156–157
Owls, enumeration of stomachs examined 17
beneficial species 10–11
harmful species 11, 15

	Page.
Pandion haliaëtus carolinensis	130–132
Parabuteo unicinctus harrisi	47–48
Pigeon Hawk	109–113
birds found in stomachs	111
distribution	109
food	110–111
nesting habits	111–112
table of stomach contents	112–113
Polyborus cheriway	128–129
lutosus	128
tharus	128
Prairie Falcon	104–106
distribution	104
food	104
mammals and birds found in stomachs	105
nesting habits	105
table of stomach contents	106
Pygmy Owl	196–198
distribution	196
food	196–197
habits in captivity	198
nesting habits	197
table of stomach contents	198
Red-shouldered Hawk	62–70
distribution	62
food	62–64
habits in captivity	65–66
mammals and birds found in stomachs	64
nesting habits	64–66
table of stomach contents	66–70
Red-tailed Hawk	48–62
distribution	52
food	48–50
mammals and birds found in stomachs	50
migration	51
table of stomach contents	53–62
Richardson's Merlin	114
Richardson's Owl	159
Rostrhamus sociabilis	25–26
Rough-legged Hawk	86–91
distribution	86–87
food	87–89
harmless qualities	88–89
nesting habits	89–90
table of stomach contents	91
Saw-whet Owl	160–162
distribution	160
food	160
habits in captivity	162
mammals found in stomachs	160
nesting habits	161
table of stomach contents	162
Scotiaptex cinerea	157–158
Screech Owl	163–173
beneficial in destroying English sparrows	166

Page.
Screech Owl distribution 163
food 163–167
habits in captivity 168
mammals and birds found in stomachs 167
nesting habits 167–168
table of stomach contents 169–173
Sharp-shinned Hawk 32–37
birds found in stomachs 34
destructive habits 33–34
distribution 32
food 32
nesting habits 34
table of stomach contents 35–37
Short-eared Owl 145–149
distribution 145
economic value in England 147
food 145–147
mammals and birds found in stomachs 147
nesting habits 147–148
table of stomach contents 148–149
Short-tailed Hawk 83–84
distribution 83–84
food 84
nesting habits 83–84
Snowy Owl 182–187
beneficial qualities 185
breeding range 185
distribution 182–183
food 183
habits in captivity 186
nesting habits 186
table of stomach contents 187
Sparrow Hawk 115–127
distribution 115–116
food 116–119
habits 119–120
mammals and birds found in stomachs 119
nesting habits 120–121
table of stomach contents 121–127
Speotyto cunicularia amaura 190
dominicensis 190
floridanus 190
guadeloupensis 190
hypogæa 189–196
Spotted Owl 156–157
distribution 156
food 157
Strix pratincola 132–139
Surnia ulula caparoch 187–189
Swainson's Hawk 72–79
beneficial qualities 74–77
distribution 72–73
food 73–77

	Page.
Swainson's Hawk nesting habits	77–78
table of stomach contents	79
Swallow-tailed Kite	20–22
distribution	20
nesting habits	21
table of stomach contents	22
Syrnium nebulosum	150–156
alleni	150
fulvescens	150
sartorii	150
occidentale	156–157
Urubitinga anthracina	84–85
White-tailed Hawk	72
White-tailed Kite	23
Zone-tailed Hawk	71

O